MOTOR AGE

Vol. XXXIII
No. 19

CHICAGO, MAY 9, 1918

Ten cents a copy
Three dollars a year

Hudson Body Types Are Distinctive

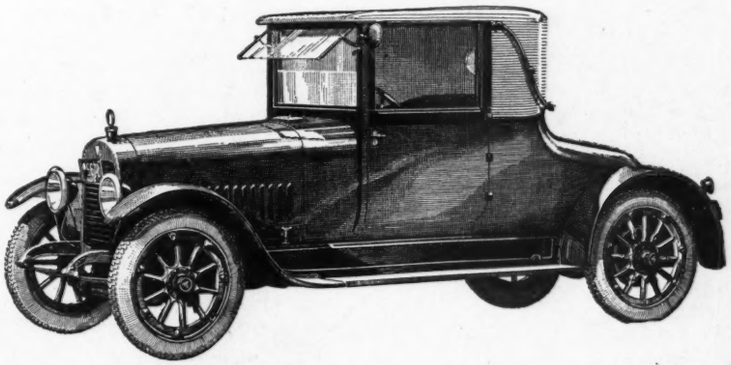
Hudson has created many distinctive body types.

The lines of the Hudson Super-Six set a standard for others. At the New York Show this year there were 22 other makers of cars that had patterned new models after the popular Hudson Speedster of 1917. Such is the prestige that Hudson has gained as a designer of fine body types.

None ever built, however, has proved more attractive than those of the present series, of which there are ten different models, as follows:

Seven Passenger Phaeton
Four Passenger Phaeton
Runabout Landau
Four Door Sedan
Touring Limousine
Town Car
Town Car Landau
Limousine
Limousine Landau
Full Folding Landau

This is the new Runabout Landau. It is the smartest car of the year.



Hudson Motor Car Company, Detroit, Michigan

Editorial Contents—Page 3

Advertisers' Index—Next to Last Page

In This Issue—Motorists and the Red Cross Drive

JOHNSON'S HASTEE PATCH

A Quick and Permanent Repair

FOR TUBES AND CASINGS

JOHNSON'S HASTEE PATCH is a quick and permanent repair for tubes, casings and rubber goods of all kinds. No time, labor or heat required. An ordinary sized patch can be applied in two minutes—and it's so simple that a child can use it. Johnson's Hastee Patch is much more satisfactory than vulcanizing because there is no danger of burning and spoiling the tube.

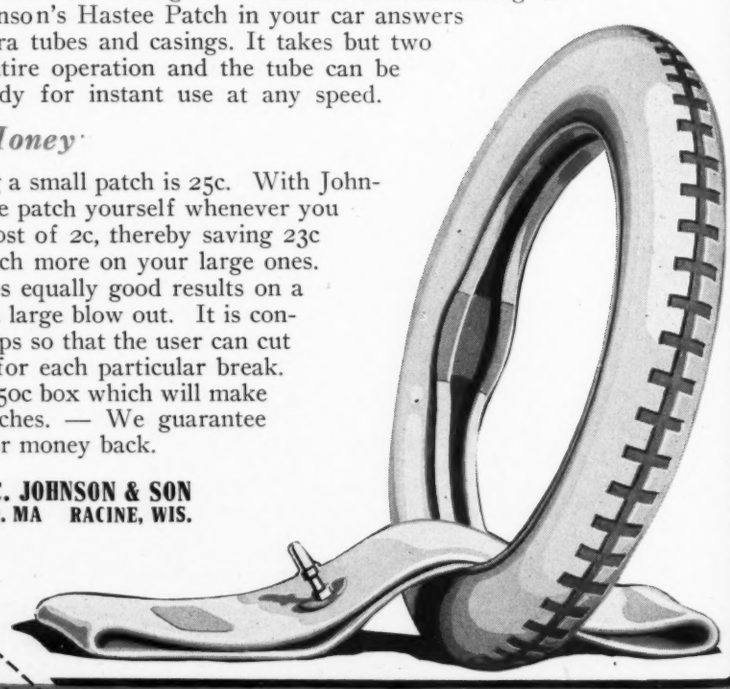
Cut Down Your Tire Investment

If you'll carry a box of Johnson's Hastee Patch in your tool kit you can get away from the expense of a lot of spare tubes and casings which fast deteriorate during the hot motoring months. A box of Johnson's Hastee Patch in your car answers the same purpose as two or three extra tubes and casings. It takes but two or three minutes to perform the entire operation and the tube can be pumped up immediately and is ready for instant use at any speed.

Saves Money

The minimum charge for vulcanizing a small patch is 25c. With Johnson's Hastee Patch you can make the patch yourself whenever you have a minute's time—and at a cost of 2c, thereby saving 23c on your smallest patch and much more on your large ones. Johnson's Hastee Patch gives equally good results on a pin hole puncture or on a large blow out. It is conveniently put up in strips so that the user can cut the right size patch for each particular break. Use coupon for a 50c box which will make 25 average patches. — We guarantee satisfaction or money back.

S. C. JOHNSON & SON
Dept. MA RACINE, WIS.



S. C. JOHNSON & SON, Dpt. MA RACINE, WIS.

I enclose 50c for which please send me by prepaid parcel post a 50c box of Johnson's Hastee Patch which I understand contains a strip from which 25 ordinary size patches may be cut. Also send me booklet entitled "Keep Your Car Young."

Name.....

Address.....

City and State.....

My Dealer is.....

MOTOR AGE

Published Every Thursday by the
CLASS JOURNAL COMPANY
Mallers Building
CHICAGO ILLINOIS

Entered as Second-Class Matter September 19, 1899, at the Postoffice at Chicago, Illinois, Under Act of March 3, 1879—Member of the Audit Bureau of Circulations—Copyright, 1918, by the Class Journal Co.

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Vol. XXXIII Chicago, May 9, 1918 No. 19

Contents

AN APPEAL TO MOTORISTS..... 5
MILITARY AIRPLANE INVESTIGATION NOW... 8
THE WAR IN PICTURES..... 10
EDITORIAL 12
State Tractor Distribution—Co-ordination of Truck Service—Does This Mean You?
1917 GASOLINE HAS GAIN..... 14
TRACTOR WHEEL REPORT..... 16
MALICIOUS TAMPERING WITH FORDSONS..... 18
THIRTY-THREE TRUCK BUREAUS NOW..... 20
FRANCE TRAINS MOTOR DRIVERS..... 24
TRUCK CONVOYS TO RUN BY RULES..... 26
MAINTENANCE VS. BUILDING ROADS..... 28
THE COUNTY OF BEWILDERING LAKES..... 30
ELECTRICAL EQUIPMENT OF THE MOTOR CAR 34
ELGIN MILITARY SCOUT..... 45

DEPARTMENTS

ACCESSORY CORNER 37
READERS' CLEARING HOUSE..... 38
OWNERS' REPAIR SHOP..... 44
AMONG THE MAKERS AND DEALERS..... 46
FROM THE FOUR WINDS..... 48

NEXT WEEK

Signboard opportunities for clubs, farmers and towns on touring highways.

BUY THRIFT STAMPS
Pay for Them with Savings Made by
DUTCH BRAND
PRODUCTS

Every Dutch Brand Product is an ECONOMY product—a tire, a car, a MONEY Saver.

2-In-1 Tread Filler, for instance, enables you to get hundreds of miles of extra service from your tires.

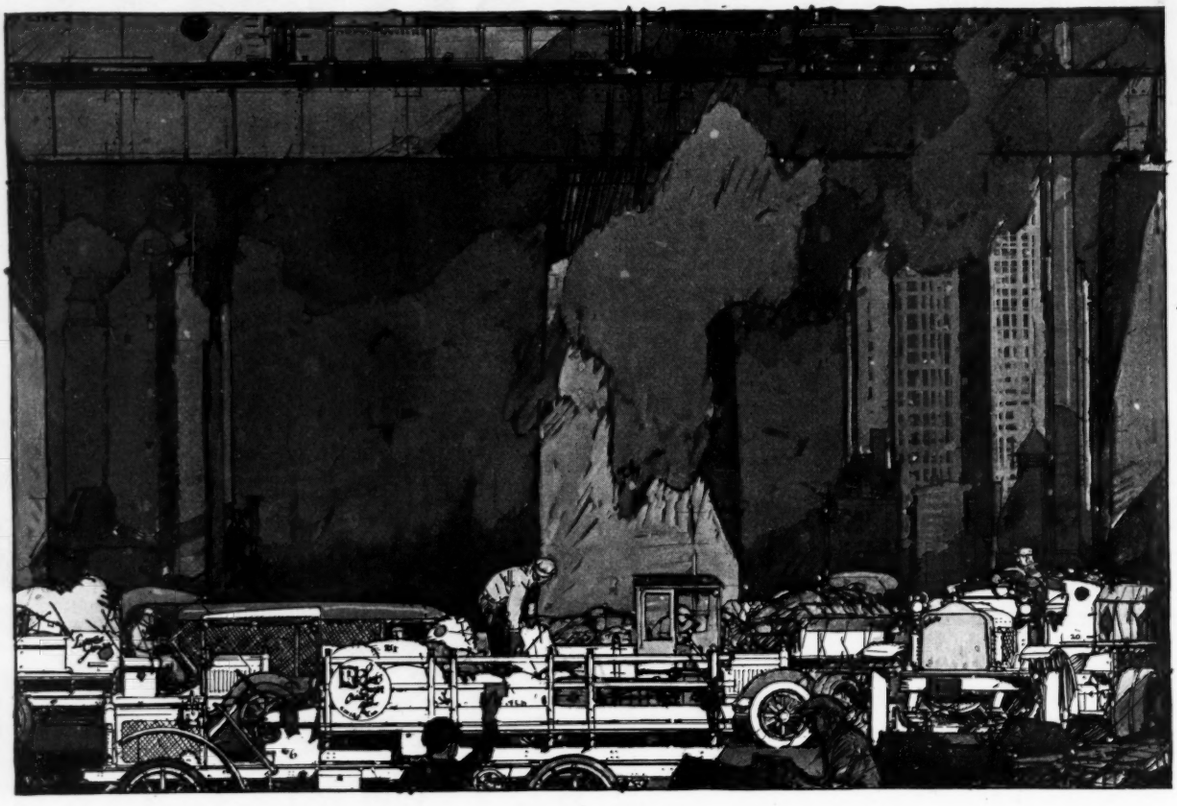
Radiator-Seal saves time, costly delay and annoyance in making emergency radiator repairs when miles from the nearest repair shop. And so on throughout the entire line. Order a first aid assortment from your dealer.

2-in-1 Tread Filler, a liquid rubber, quickly closes casing bruises; **Radiator-Seal** instantly stops radiator leaks; **Auto Patching Cement** insures a patch that will stick and stay stuck; **Rubber-Seal** permanently heals large cuts and gashes in casings and tubes; **Vulcanizing Cement** for use with small portable vulcanizers, or for shop use; **Carbo-Cide,** a carbon solvent of unsurpassed merit; also **Valve Grinding Compound, Auto Top** and **Cushion Coating, Gasket Shellac, Varni-Brite,** and **Auto Polish, Tire Talc** and **Friction Tape.**

Write for new catalog

DEALERS: To avoid possibility of delay, stock through your jobber *at once.* Send for handsomely illustrated catalog of complete line.

VAN CLEEF BROS.
Manufacturers Dutch Brand Rubber Cements and Auto Chemical Specialties
7701-7711 Woodlawn Ave. Chicago



Roll Call

of WHITE TRUCK FLEETS *in* ACTUAL SERVICE

THERE are 2,153 White Truck Fleets now in service, totaling 23,226 White Trucks, exclusive of all single truck installations.

These fleets have grown to their present size through repeat orders constantly increasing year after year. Their owners represent the very pick of American industry and commerce who demand unfailing truck performance and who base their purchases on carefully kept cost records.

The 1918 Roll Call of White Trucks gives a list of owners ten trucks or more, showing their annual purchases of White Trucks since 1910. A copy will be sent to any address upon request.

THE WHITE COMPANY
851 East 79th Street
CLEVELAND

Vol. XXXIII, No. 19 Chicago, May 9, 1918 $3.00 Per Year

MOTOR AGE

Hear Ye! Hear Ye!
All Motorists!

You have set a record for patriotic service during the Third Liberty Loan Campaign no others of similar union can surpass. But one good turn deserves another! The Red Cross drive is looking to you to help carry it over the top. Was the great fraternity of motorists ever appealed to in vain? No, and neither will it be this time. "Two million men 'over there' by January 1" is the slogan now. Help the Red Cross to bring back to us our men!

A DOZEN IDEAS AS TO HOW

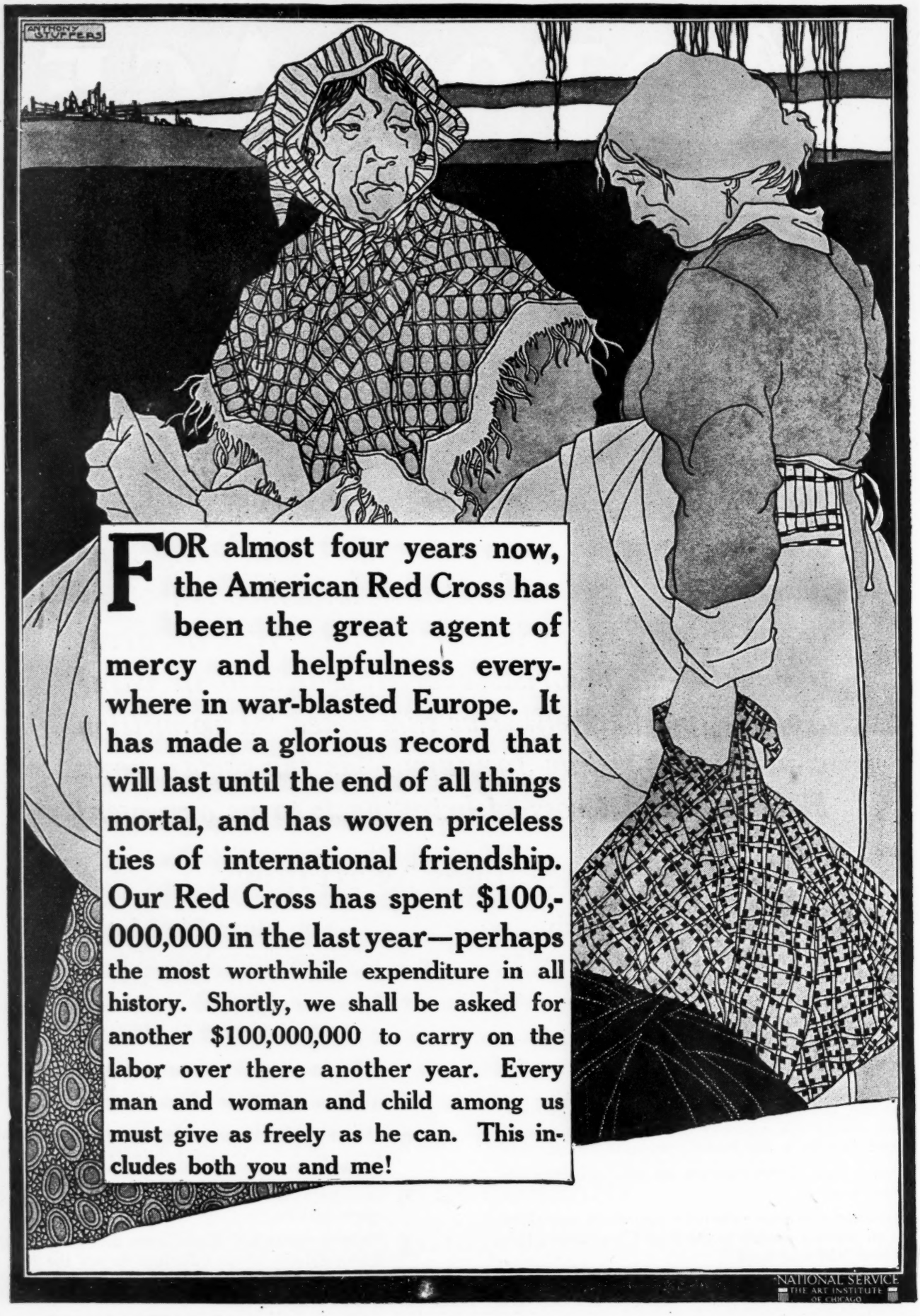
If You Have a Motor Club

1. Use that Liberty Loan committee organization or form a new one at once.
2. Pledge so many of your cars, with drivers, for Red Cross errands daily.
3. Circularize the members as you did in the Liberty Loan campaign—for offers of a car for a day.
4. Divide your members into quotas of twenty, and assign one member to canvass that twenty until they back the Red Cross to the limit.
5. Carry Red Cross stickers on your windshields from now on.
6. Arrange a system whereby members pay dues of so much a month to the Red Cross, even if it is just "chicken feed."

If You Have No Motor Club

1. Gather together as many of your motorist acquaintances as possible to plan a motor drive.
2. Your local newspaper gladly will carry a call for a public meeting of motorists. Let it cooperate with you.
3. If you organized a war committee for the Liberty Loan campaign, carry on the same organization now.
4. Tabulate offers of cars for a day or more and place the list at the service of your Red Cross chapter.
5. Appoint a flying squad to see every motorist for subscriptions.
6. Have a motorists' Red Cross day on the main thoroughfare, silver offerings to pay the toll.

BE SURE TO READ PAGES 6-8


ANTHONY STUFFERS
FOR almost four years now, the American Red Cross has been the great agent of mercy and helpfulness everywhere in war-blasted Europe. It has made a glorious record that will last until the end of all things mortal, and has woven priceless ties of international friendship. Our Red Cross has spent $100,000,000 in the last year—perhaps the most worthwhile expenditure in all history. Shortly, we shall be asked for another $100,000,000 to carry on the labor over there another year. Every man and woman and child among us must give as freely as he can. This includes both you and me!
NATIONAL SERVICE
THE ART INSTITUTE OF CHICAGO

The Call

The American Red Cross will enter on a campaign for the raising of a Second War Fund and will make an intensive appeal to the public during the week set aside by the President, May 20-27. The society must have this fund to carry on its work of humanity. Your dollar may mean the saving of some one near and dear to you "Over There." It will mean the saving of someone, either in the actual fighting lines or in the war-stricken regions at large. *It is up to you, the American public, and there is no one group of persons who can do more to help the Red Cross drive than the motorist.*

The Work

Tuberculosis and the many new and terrible diseases that have developed from trench warfare, and which are incident to army life, must be fought—and conquered. They must be conquered both to preserve our own men "Over There" and to aid our allies. To the degree in which we are able to conserve man power we shall help to win the war. The Red Cross conserves man power. *Motor cars conserve man power also by making for greater efficiency. Get together.*

What It Is

The American Red Cross is the only volunteer society now authorized by the United States government to render aid to its land and naval forces in time of war. Any other society desiring to render similar assistance can do so only through the American National Red Cross, according to General Order No. 170 of the War Department, 1911. *Help render this aid by helping through your club and cars make it possible to have more ambulances.*

Its Functions

The purposes of the American National Red Cross are:

1—To furnish volunteer aid to the sick and wounded in time of war.

2—To act in matters of voluntary relief and in accord with the military and naval authorities as a medium of communication between the people of the United States of America and their Army and Navy.

3—To carry on a system of National

Chauffeurs Respond!

The chauffeurs of the Automobile Club of America have this Red Cross workroom in their clubroom in New York. Sweater and sock-knitting machines are part of their equipment. The chauffeurs are an auxiliary of the New York County chapter. Wool is donated by the Colony Club. When this photograph was taken, their first sock machine had a record of 1000 pairs. The men work only at odd moments, between calls. One man can finish a sock every 4 min. Another can turn out a sweater in 14 min. The men work in relays. When one leaves off another takes his place. Twenty-five chauffeurs in the last three months have become Red Cross experts.

A Hint to the Wise!

White Garage, Billings, Mont., tells MOTOR AGE how it raised $200 for the Red Cross. The picture also tells how it was done. In addition the Denver Motor Club tells of an old-tire day in which $628 was raised for the Red Cross. The old-tire day grew into an old-tire week on account of bad weather, and at the end of the week the receipts totaled $628.48. Most of the club's more than 1200 members responded with old tires, and outsiders joined in also. Members canvassed the business concerns. Others donated trucks to collect the tires. The collection weighed 10,930 lb.

Where Red Cross Money Goes

First War Fund appropriations up to March 1, 1918, and how they were expended by the American Red Cross.

Foreign Relief:	
Relief in France	$30,936,103.04
Relief in Belgium	2,086,131.00
Relief in Russia	1,243,845.07
Relief in Roumania	2,676,368.76
Relief in Italy	3,588,826.00
Relief in Serbia	875,180.76
Relief in Great Britain	1,885,750.75
Relief in other foreign countries	3,576,300.00
Relief for prisoners, etc.	343,304.00
Equipment and expenses here for personnel in Europe	113,800.00
Total foreign relief	$47,325,609.38
Restricted as to use by donor	2,520,409.57
United States Relief:	
U. S. Army base hospitals	$ 54,000.00
U. S. Navy base hospitals	32,000.00
U. S. medical and hospital work	531,000.00
U. S. sanitary service	403,000.00
U. S. camp service	6,451,150.86
U. S. miscellaneous	1,118,748.41
Total U. S. relief	$ 8,589,899.27
Working capital for purchase of supplies for resale to chapters or for shipment abroad	15,000,000.00
Working cash advances for France and U. S.	4,286,000.00
Total of War Fund appropriations	$77,721,918.22

and International relief in time of peace and to apply the same to mitigating the sufferings caused by pestilence, famine, fire, floods and great National calamities.

The society is supported entirely by voluntary contributions.

Be a motorist voluntary and help drive the Second War Fund over the top.

Military Airplane Investigation Now

To Probe Charges Alleging Those Interested in Program Profited from $640,000,000 Fund

WASHINGTON, May 4—President Wilson has decided to hold a military investigation of the charges alleging that men interested in the aviation program profited in the expenditure of the $640,000,000 appropriation. The President's stand is the result of the recent publicity. His attitude at first was that the charges were exaggerated, but owing to the fact that public opinion is being molded by the many rumors and sensational Senatorial discussions, the Administration has changed its policy and will sift the situation to the bottom. It is also quite likely that the report of the Snowden-Marshall Committee may be made public as the result of the publicity pressure.

Charges of profiteering and demands for investigations of the airplane appropriation expenditures were made in the Senate this week. Several members of the Military Affairs committee put themselves in favor of re-opening the inquiry, but it was pointed out that the committee has no power to deal with criminal prosecution and the matter was referred to Secretary of War Baker, who has declared his willingness to sift the charges thoroughly and to sanction court martial proceedings for civil trial if it can be shown that there has been deliberate retarding of work, profiteering or pro-German efforts to interfere with production.

It is reported that the statement filed with the President by Gutzon Borglum made a series of general accusations and, in particular, accused Colonel E. A. Deeds of incompetence, profiteering, pro-German sympathy and said his real name was "Dietz." To those in Washington who know Colonel Deeds and his work, the charges are regarded as absurd. Colonel Deeds himself takes them in a jocular manner. It is also reported that Mr. Borglum has a grievance of some standing with Colonel Deeds and it has been suggested that it would be interesting to have Colonel Deeds permitted by his superior officers to tell his side of the story. He has expressed himself as willing and anxious to have the Gorglum charges investigated. It has been stated here, in criticism of the Borglum report, that it contains no facts beyond those frankly admitted by Government departments with reference to delays and it makes no attempts to analyze the causes of delay other than to say that they are the result of corruption and disloyalty. It also is pointed out that the charges against Colonel Deeds are unsupported by evidence.

The Senate, in discussing the Borglum report and also other reports which credit the Liberty engine to the Packard company, became highly indignant over the fact that the Liberty engine was claimed by the War Department to be an original engine designed directly for the United States military establishment.

As a matter of fact, the Liberty engine is wholly different from the Packard aviation engine, except that it includes certain ideas taken from European engines and which also were incorporated in the Packard engine.

It further was stated by various Senators that the Military Affairs committee was misinformed and misled for several weeks by the aircraft board and the Signal Corps, that the Liberty engine, they were told, could be developed in six months instead of the year it has taken and that Secretary of War Baker was as completely deceived by the men closely connected with aircraft activities. It is expected that Mr. Borglum will file a complete report with the Senate soon.

PRIZES FOR HAULING EFFICIENCY

Detroit, May 6—The Packard Motor Car Co. is offering $5,000 in prizes to owners and drivers for efficiency in motor truck transportation. The awards will be made according to certified records of Packard truck operation over a period of three months beginning June 1. There will be three prizes of $1,000 each for owners and three of $500 each, three of $100 and three of $75 each for drivers.

The trucks will be divided into three classes, 1½-ton and 2-ton in Class A; 3-ton and 4-ton trucks in Class B; and 5-ton and 6-ton trucks in Class C. The winner in each class will receive $1,000, while three awards to the drivers will be made in each class. Entry blanks, rules and standard cost forms can be obtained from Packard dealers.

The company hopes to further through this test carrying full loads, careful routing and proper maintenance of trucks, important factors in helping solve transportation problems. In addition it expects to make more universal the standard truck cost system form adopted and advocated for general use by the Truck Owners' Conference, Inc., of Chicago.

RUN PROVES OUT WINTHER

Winthrop Harbor, Ill., May 6—The Winther Motor Truck Co. points with pride to the record made by two of its 3-ton trucks, which were made up with giant pneumatics for the Navy and made the trip to Washington overland. The trucks left here at 4 o'clock Thursday afternoon and arrived in Washington 4 o'clock the next Monday afternoon, 950 miles in four days, or an average of 237.5 miles a day. Lieutenant Merrill of the Great Lakes Naval Training Station was in command, and jackies drove the trucks. The trucks are to be used for carrying gun powder between points in the East.

WOULD HAVE OWNERS DRIVE

Columbus, Ohio, May 3—The annual convention of the Ohio State Automobile Association here to-day is featured by a resolution urging car owners to drive their own cars so that chauffeurs may be released for war service. Another resolution indorses the governor's movement to arrest loafers to be put at productive labor as prisoners.

The association voted $1,000 to assist in raising $50,000 for the completion of the unimproved portion of the Dixie highway in Kentucky. The fund now is $41,000.

The new officers are: President, Judge Walter D. Meals, Cleveland; vice-president, F. S. Bentley, Warren; secretary, Fred H. Caley, Cleveland, re-elected; and treasurer, Walter A. Pfeifer, Columbus. The 1919 convention will be held at Columbus.

NEW PERSONNEL OF BOSCH

New York, May 3—The new officers of the Bosch Magneto Co., which was taken over by the Alien Property Custodian, as announced in previous issues, are: President, Joseph H. Bower; vice-president, Christian Girl; treasurer, George A. McDonald; secretary, William G. Fitzpatrick; assistant treasurer, A. D. Altree; and general manager, A. T. Murray. The induction of the new officers indicates how the work of the company is to be continued. Only the Springfield plant is to be operated. Eight hundred men are at work, and this number may be increased soon. The present activities of the company are centered almost entirely on the production of magnetos, only a small percentage of the output being used by the Government.

"STURMPANZERKRAFTWAGEN"

Chicago, May 6—To "She sells sea shells" and Peter-pepper-pickle rhymes you may now add "sturmpanzerkraftwagen." A document lost by the Germans gives out the spicy information that this is what they call their tank. However, that need give you no alarm. Its bark is worse than its bite, and besides United States tank service recruits are all born scrappers. The emblem of service is the tomcat rampant, and the motto is "We treat 'em rough."

UNIONTOWN HAS FIFTEEN ENTRIES

Uniontown, Pa., May 6—Special telegram—Motor racing for the season of 1918 will be inaugurated by the Liberty sweepstakes for the Universal $3,000 trophy cup at the Uniontown speedway May 16. Fifteen cars have been entered in the trophy race, and Louis Chevrolet in a Frontenac and Barney Oldfield in his Golden Submarine will compete in a special match race for a $10,000 purse. There are 120 miles in the trophy race, split up into five heats of 24 miles each with the prize money divided twenty ways. Drivers now entered in the sweepstakes and their cars are:

DRIVER	CAR
Chevrolet	Frontenac
Not named	Frontenac
Oldfield	Golden Submarine
Hearne	Frontenac
Vail	Hudson
Mulford	Frontenac
McBride	Not named
Toft	Miller Special
Not named	Duesenberg
Milton	Roamer
Fetterman	Peerless
Hickey	Stickel Special
McCarthy	Hudson
Gardner	Hudson
Lecocq	Roamer

Prizes in each of the first three heats are $500, $200, $100 and $50. Fourth heat prizes are $300, $100, $75 and $50. Final heat prizes are $1,500, $800, $500 and $250.

Denials of 75 Per Cent Car Curtailment

Members of War Industries Board Verify Lack of Figures as to Production Decrease

WASHINGTON, May 4—Newspaper dispatches telling of Government control of steel and adding that a 75 per cent or greater curtailment of the motor car industry will be demanded, are without official foundation, as stated in the issue of last week. Denials have been made by Barnard M. Baruch, chairman of the War Industries Board; George N. Peek, industrial representative of the War Industries Board; and J. Leonard Replogle, director of steel products, War Industries Board, to the effect that no figures have been set as to what curtailment will be asked of the industry at the coming meeting. The Government to a large extent has taken over control of steel and pig iron by signed pledges from steel producers to the effect that they will place the war steel requirements of the country ahead of other lines of business. The pledges were signed by every representative of the steel industry who met with Mr. Replogle recently in New York. At that time, Mr. Replogle pointed out specific instances where shells, ships and freight cars were delayed by steel shortages and hinted of new military inventions which would involve considerable use of steel.

The newspaper dispatches also added the absurd information that the motor car industry produces 2,000,000 cars a year which is sufficient to produce 9,000,000 tons of shipping tonnage, so far as the steel requirements are concerned. This estimate apparently was based on the ridiculous estimate of each passenger car weighing 4½ tons and being made wholly of steel. The dispatches have created considerable consternation and worked harm upon dealers and manufacturers. They were apparently the work either of a designed propaganda fostered by some enemies of the industry or are the work of a newspaperman in Washington, who handles the War Industries Board news for a press association and who seems constantly to be imbued with the idea that every reduction of materials for general business use means further curtailment of the motor car industry.

According to statements made by Mr. Baruch and Mr. Replogle, it is quite certain that a radical reduction in passenger car manufacture will be demanded at the meeting between W. C. Durant and his committee and Washington officials next Tuesday. The reduction most likely will be 50 per cent. The manufacturers are asking for a reduction of 33⅓ per cent, based upon the last three years' business.

Reports that Washington authorities will cut off completely the supply of steel to non-war industries are not correct, according to the interpretations made by steel manufacturers. They point out that Washington now regards all industry as essential, speaking of some as less essential, and does not contemplate complete curtailment of steel from the less essential industries but instead aims to establish a full list of all classes of steel consumers in a sequence with the most necessary given priority.

RICKENBACHER DOWNS PLANE

Detroit, May 3—Lieut. Eddie Rickenbacker has brought down a German airplane, according to dispatches from France. Rickenbacker went to France as personal chauffeurs for General Pershing. He enlisted and was made a sergeant. He accompanied General Pershing as his personal chauffeur in his tour of all sectors on the western front. Later he obtained a transfer to the Signal Corps, five weeks after which he completed the usual three months' course of instructions. He was commissioned first lieutenant and assigned to the mechanical division, later being transferred to the flying division.

TEXAS ORGANIZING TRANSPORT

Houston, Tex., May 3—The Texas Good Roads Association will organize its members into a motor transport committee and offer its services to the state and National Government for transporting troops from any camp in Texas to any point in the state. The idea is to transport the troops by relays. If troops were needed at the border from Wichita Falls, Fort Worth, Waco, San Antonio or Houston, the association would notify the secretary of the unit in each town along the route to notify all the members where to report with their cars. Members in the city where the soldiers were stationed would report to the camps with cars as soon as the call went out. Others along the route would relieve them at certain points.

It is planned to enlist enough for this service to make the relays as short as from 25 to 40 miles, which would not take any one member from his business very long. Pilot cars would be provided, and right of way over the highways would be obtained.

Tire service companies will be asked to send expert tire men and stock along to care for all troubles of their handling.

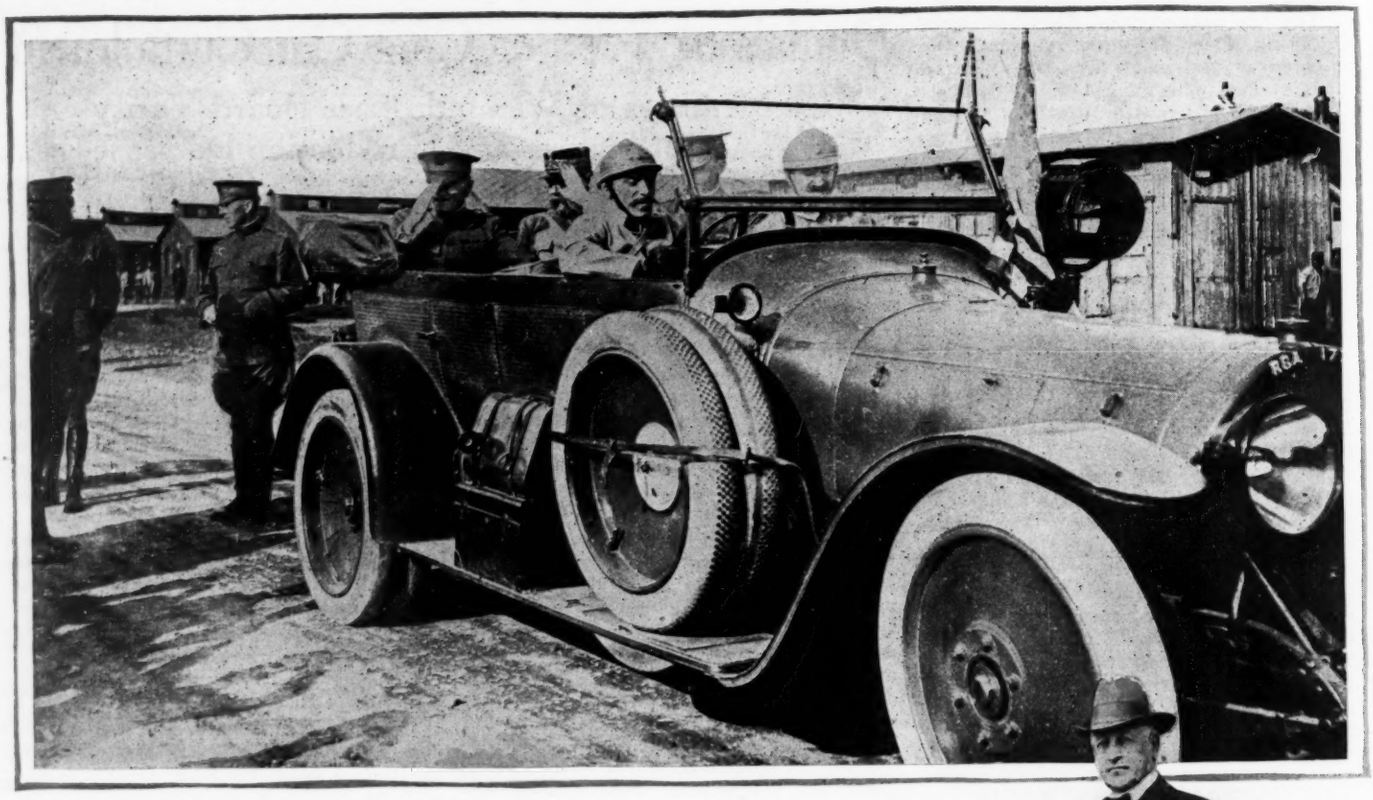
Completion of the plans await only the signing up, or enlisting, of the association's members, which is being done.

UNIVERSITY TRAINS MECHANICS

Austin, Tex., May 4—The University of Texas is enlarging its school of motor car and radio mechanics to a capacity of 3000 or more students. The university is erecting shops and cantonment buildings at Camp Mabry, Austin, at a cost of $400,000. The school is already in operation in the engineering department of the institution.

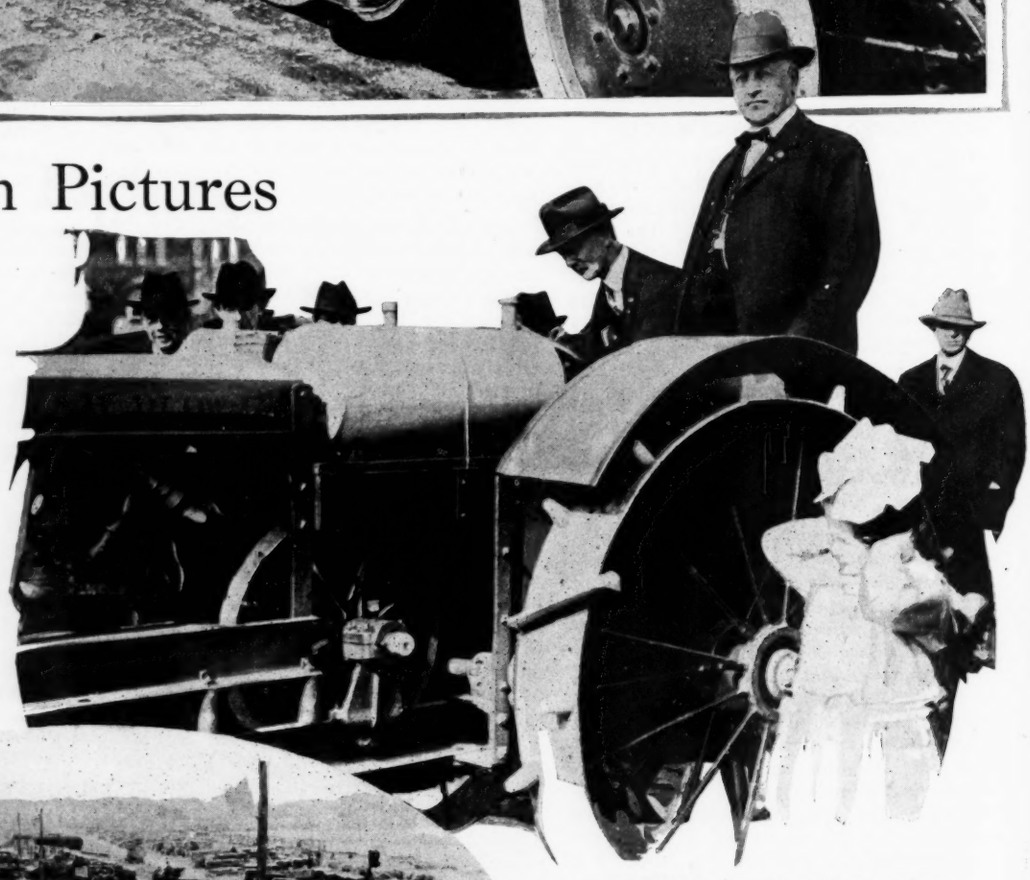
BRITISH ARMY MOTORS GROW

London, England, April 16—The number of motor trucks in the possession of the British army increased 43 per cent during the last year. In the same time the number of motor cars and ambulances increased 73 per cent. These figures are exclusive of the replacement of wastage.



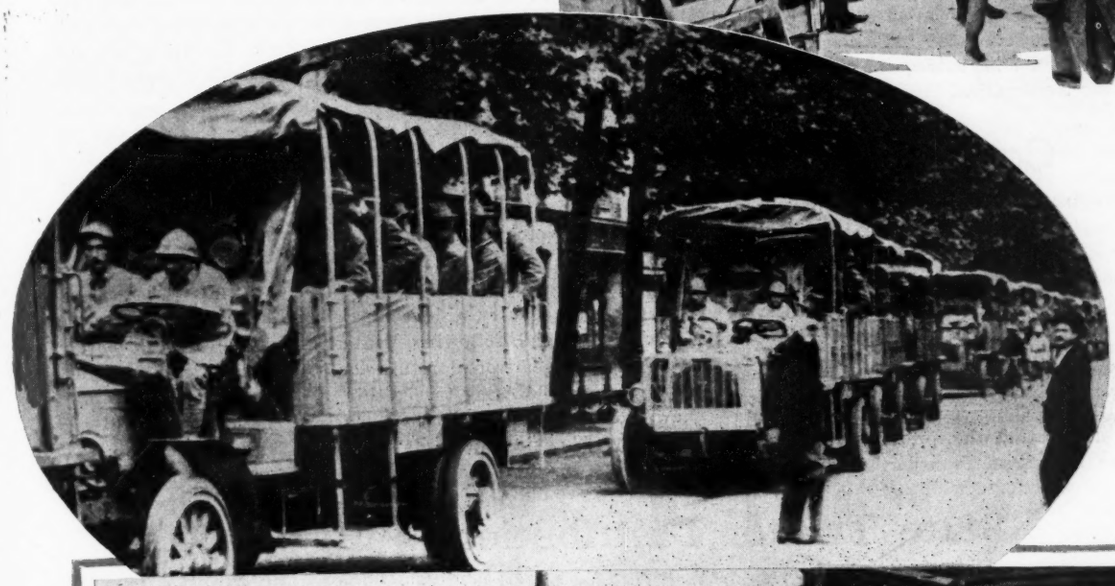
The War in Pictures

General Pershing with French officers is shown arriving at the Le Bourget aviation camp in France. And below is pictured an assembly depot for American motor vehicles "Somewhere in France"

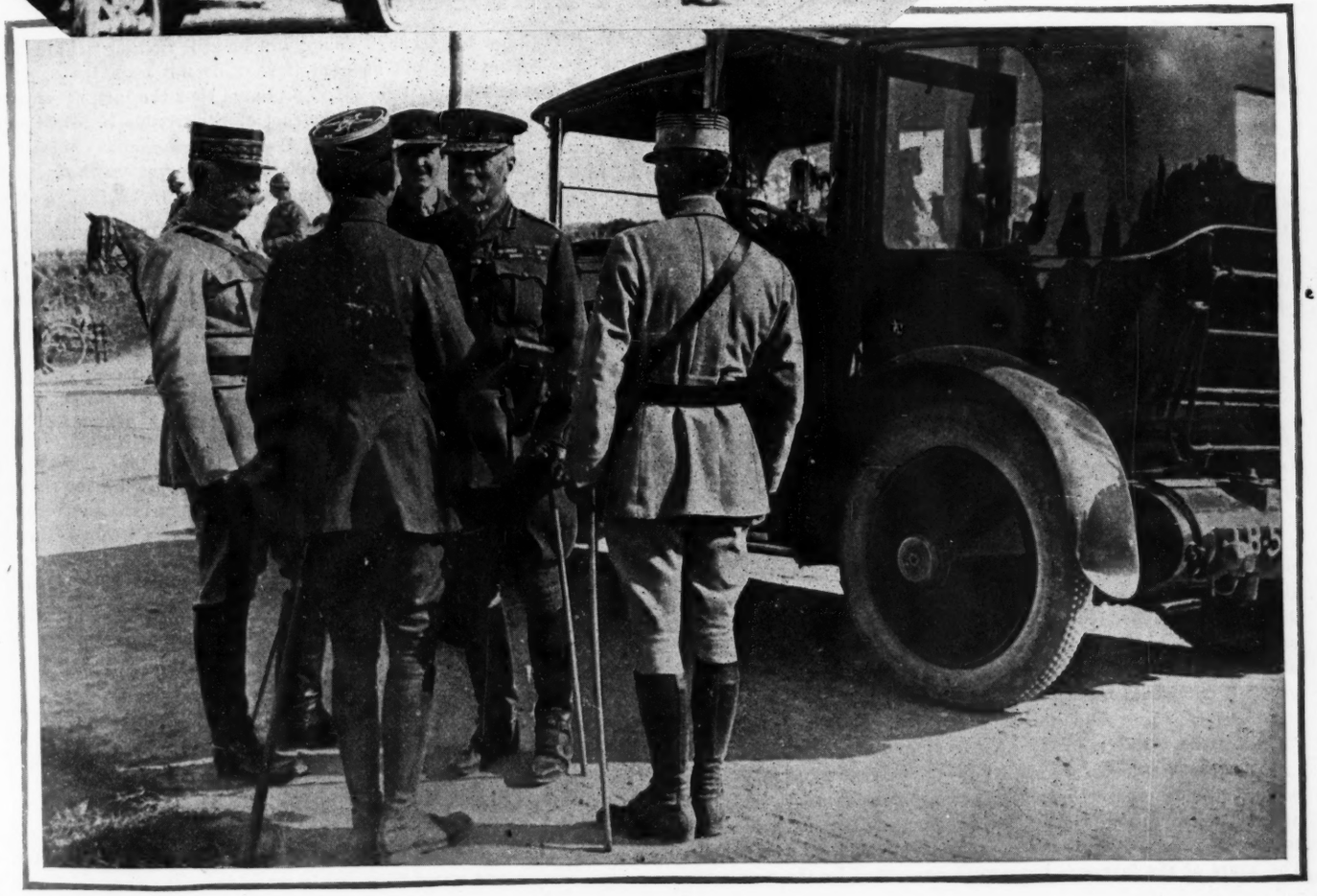


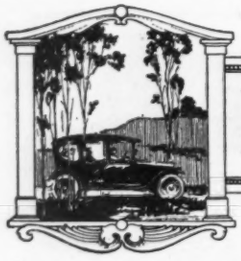
The war garden drive in Los Angeles is being started by California's governor, above. A million vegetable plants a month will be distributed free to war gardeners in the city from May to December. The city's prettiest park now embraces a 5-acre garden, and its inauguration was featured by the launching of a big tractor by Gov. W. D. Stephens

Soldiers of the Quartermaster Corps in France are loading supplies for troops at the front, some of whom are shown in a long line of trucks passing through a French city on the way to the trenches and firing line

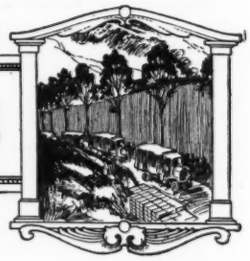


General Haig here is about to enter his car after a visit to the French front. This is one of the first photographs to reach this country showing the cooperation of the Allied armies in Flanders





EDITORIAL PERSPECTIVES



Airplane Investigation

PRESIDENT WILSON'S order for a thorough search into the charges of graft and criminal delay in aircraft production will be welcomed by all good Americans, provided publicity is given to those important facts connected with the aviation industry and the aircraft program which have been concealed for the last half year. It is not the Borglum report nor his subsequent charges of graft, nor is it the report of the Aeronautical Society of America which makes such an investigation necessary, but it is the need of setting the people straight as to the exact status of the situation. The people must be behind the Government on this aircraft program and an authoritative report, which will bring out publicly those facts which cannot be considered as giving aid and comfort to the enemy but which advise our people of those things they should know, is needed.

Co-ordination of Truck Service

WITH the growth of the return loads bureau idea here and there throughout the country it becomes increasingly apparent that the appointment of a Government director not only would be a desirable move but a most wise move. Thirty-three such bureaus have been established so far, in five states and the District of Columbia. And the idea is growing. Its development in New England, Ohio, Michigan, Indiana and Illinois in the future cannot come about as successfully without some Government director as it can with it. There cannot be that maximum of results without such a director, who, preferably, would work in conjunction with the Highways Transport Committee in Washington, which already has done much to further the spread of the return loads bureau.

A DIRECTOR of return loads bureaus could most successfully direct a country-wide campaign to keep the roads clear of snow this and following winters. That this is absolutely necessary for year-round return loads bureaus is evident, from experience of the Army trucks this winter if from nothing else. New York and Massachusetts as states have recognized this necessity of keeping the roads open and have provided $1,000,000 and several hundred thousand respectively for this purpose.

State Tractor Distribution

ON the face of the returns it does not seem that Michigan's method of tractor distribution through the state War Preparedness Board was a brilliant success. After disposing of slightly more than half of the 1000 tractors allotted, this board gave up and the manufacturers have turned the distribution of the rest over to their own agents in the state. As a reason, the War Preparedness Board says that the farming season in that territory is too far advanced to sell tractors; that farmers have their work for the season too well under way.

IF that is the difficulty, how will the tractor agents succeed any better? How will Iowa and Ohio, with 2000 tractors to market, hope to succeed? They will be still further behind the season. They will not succeed if they do not organize an efficient distribution system. It is probable that the lack of proper experience in distribution is the root of the trouble in Michigan.

IOWA and Ohio are trying slightly different methods and methods which should be more successful. Although the orders for those states are placed in the name of the state, they will only be the executives in the deal. Sales or distribution will be in the hands of men who are experienced in that field and who, it is to be expected, will be permitted to carry on their campaign without interference from state officials.

Does This Mean You?

A week or so ago MOTOR AGE reproduced a small sticker which ran like this: Are you one of the "hicks" who still says "pleasure car?" Wake up! Say "passenger car." Don't be a Rip Van Winkle. Just now when we are undergoing a 30 per cent curtailment of passenger car production and the makers are meeting to agree on what the curtailment shall be after the first period agreed on ends, which will be July, this is more opportune than ever. The passenger cars of this country are traveling 40,000,000 miles a day—the equivalent of 1600 times around the earth. They give an estimated annual passenger-mile service of 60,000,000,000, which is 25,000,000,000 more than our railroads give. What would the country do without them?

TAKE the farmer. When help is abundant no one thinks of machines to conserve man power, but just as soon as man power becomes scarce means of transportation, both old and untried, receive attention. The indispensability of the motor car on the farm is being realized more this year than ever before. The hours of the farmer's busy week conserved by the motor car are more apparent as his duties increase through urgency of decreased labor and necessity for increased production. The shortage of motor cars, due to the industry's response by its equipment for war manufacture and the voluntary curtailment resulting therefrom, already has been felt on the farm. The demand from the great farming territory of the Mississippi Valley and agricultural South is insatiable. It probably would be with normal output. It certainly is with fewer new cars and fewer used cars on the market.

TAKE the city. The salesman uses the car to cover more territory than a salesman ever could cover without it. The busy man or woman who is doing war work uses it for the errand to town, the trip for this war organization or that, the messenger for this corps, that department. The cars parked in the downtown streets and areas are there on business. A man drives to his office in, his car not for the pleasure but that he may get there quicker and get more done after he gets there through the ease, health and speed obtained by the use of the car.

Fordson Tractors in England

Give Fine Results in Spite of Difficulties Offered by the Great Variety of Soils

LONDON, England, April 15—The Fordson tractors purchased by the government are getting into general use throughout England and are giving fine results. While dealers in other makes of tractors naturally feel that the situation is against them, still the broadminded ones acknowledge that under present conditions the British government has taken a necessary step and that the government should increase the number of Fordsons or any other standardized type that is being used rather than permit the importation of miscellaneous types of machines.

It is questionable if the importation of miscellaneous lines of tractors will be permitted during the present year, as all ocean space available now is required for government imports.

The question of dust in tractor engines, which has given so much trouble in parts of America and has proved so ruinous to engines, will not be so difficult a problem to overcome in England. Here the summers are not sufficiently hot and dry, and it is rare that you see the dust so bad that you cannot walk behind the plow with comfort.

It is possible that the burning of kerosene will not be extremely difficult, as the greater moisture content in the air may be of assistance. Here the fields are smaller and the continuous strain on the engine not so great.

One of the greatest difficulties with tractors in England is the very great varieties of soil. Frequently in the same field soil conditions change entirely as you will have sand, loam, gravel and chalk as close to each other as the fences along the roadside. This imposes a heavy work on the tractors and calls for engine power equal to the heaviest job.

TRUCK AND WOMEN FAME NOW

Louisville, Ky., May 3—No longer should one most versed in the signs of the times refer to the fame of Kentucky as based on her women and horses but rather on her women and motor trucks, for the first woman driver of a commercial car in Louisville made her appearance at the wheel of a truck belonging to the Kaufman-Straus Co., one of the city's large department stores, recently. She is Miss Jessie Bell, eighteen years old and a graduate of one of the motor car classes held for women here.

TRUCKING ON FIVE ROUTES

Kansas City, Mo., May 3—Five of the rock roads leading to important farm communities within 40 miles of Kansas City have motor truck freight service maintained by the Suburban Motor Transfer Co. of Kansas City. For several years a truck company maintained a service merely for hauling milk. Now trucks make daily trips at specified hours over five routes to towns as far as 40 miles from Kansas City. Route 1 is to Martin City, 15 miles; 2, Belton, 24 miles; 3, Longview Farm; 4, Lee's Summit, 25 miles; 5, Pleasant Hill, 40 miles.

The trucks are equipped with simple racks on their sides, which hold empty cans so that 2 to 3 tons of freight can be carried in the body on the out trips. In addition to the delivery of goods to the retail merchant's store door, the company also delivers goods occasionally to farmers along the line, when the orders do not conflict with the retail business of the merchant with which the company is especially concerned in a small town. The company also makes special trips to collect live stock. It has zones in the Kansas City territory and special prices for live stock fares, collecting as a rule only along the rock roads and charging 50 cents a mile additional for side trips.

The company maintains a freight station in the wholesale district. Goods from railroads or jobbers are delivered in the afternoon and loaded on trucks. These trucks start early in the morning and collecting whatever other freight may have accumulated in the south part of Kansas City proceed on their routes.

The company operates ten trucks, practically all of which are used every day on regular routes. Most of them, however, are on the routes only half a day, the rest of the time being in city transfer service. Local transfer companies maintain only delivery and apply the company's trucks for their local delivery of over 2 miles.

The trucks have not missed a trip on rural routes in two years and only once last winter was a truck late—5 hr. That day the railroad trains were 24 hr. late from the main station.

TO A SIX-YEAR-OLD

Little friend of all the world,
Sitting at the wheel,
Make believe that you are driving,
That you're soon to be arriving
At the goal for which you're striving,
May it soon be real!

Little friend of all the world,
Smiling at your play,
Do no ruts rise to assail you,
Do no high hills rise to quail you,
Does your dream car never fail you?
May it be that way!

Little friend of all the world,
Laughing as you go,
Weary of the play suspended,
Is the goal, the long trip ended,
All that fancy's veil pretended?
May you find it so!

—John B. Terns.

BAY STATE TO FIGHT SNOW

Boston, Mass., May 3—The Committee on Roads and Bridges has reported a bill to authorize the Massachusetts Highway Commission to spend $100,000 next winter keeping the highways open for motor truck traffic. It was not done this year because the money was not available, the motor vehicle fees being for road maintenance specifically. The $100,000 will be taken out of the regular registration fees and fines, which now total more than $2,000,000 each year. This will be a good start toward giving the return loads bureau plans in New England a further boost, as Connecticut now keeps the roads ways without snow from New York to Boston and from Albany to Boston, as well as to Providence and Portland in other direcclear and this will insure complete hightions.

BRITISH TO BUILD ROADS

London, England, April 16—The building of main highways for motor trucks will unquestionably be one of priority after the present war. As already suggested in these columns one of the works of the reconstruction commission in England will be the building of trunk roads. These will not always be new highways but existing roads that will be straightened out, graded and widened according to motor traffic needs.

The heavy traffic of the last three years of war, coupled with the almost complete cessation of normal road repairs, has broken down the crust of many of the main highways to such an extent that a resumption of normal road traffic after the war would be impossible without quick steps for repairs.

NEW RECEIVER FOR POPE

Hartford, Conn., May 3—Arthur L. Shipman has been appointed receiver of the Pope Mfg. Co. to succeed Col. George Pope, who died recently. The firm of Gross, Hyde & Shipman, of which the new receiver is a member, has been counsel for the late Colonel Pope as receiver of the Pope company.

1917 Gasoline Has Gain

Increase of 2,000,000 Gal. a Day Equal to 32 Per Cent Over 1916

Crude Oil Production Shows Equal Growth

WASHINGTON, May 3—During 1917 there was a 32 per cent increase in the production of gasoline, or nearly 2,000,000 gal. per day more than in the calendar year 1916, according to the latest figures of the Bureau of Mines. The actual daily increase in gallons over 1916 was 1,853,306. That the increase in production is steadily gaining and has been gaining during 1917 is indicated by the fact that the production of gasoline during the last six months of the year was much greater than during the first six months.

The gasoline production for 1917 was 2,729,712,033 gal. On a basis of 365 working days, this represents a daily production of 7,478,630 gal. In 1916 the daily production was 5,625,357 gal. The total increase of gasoline produced in 1917 as compared with 1916 is over 2,000,000,000, the exact figures being 2,058,880,596 gal.

During the same year that the production of gasoline was increasing 32 per cent the production of kerosene increased but 7½ per cent. The total quantity of kerosene produced in 1917 was 1,566,015,103 gal. as compared with 1,455,495,732 gal. in 1916. This represents a net increase of 110,519,731 gal.

While the production of gasoline and kerosene was increasing the healthy condition of the crude oil situation throughout the country is indicated by a 22 per cent gain in production during the same period. The production of crude oil is given in barrels of 42 gal. each. For the year the production was 301,319,318 bbl. as compared with 246,992,596 bbl. in 1916. This represents an increase of 54,326,727 bbl.

Production of crude and distillates made its greatest gain during the last six months of 1917. For example, 13,128,994 bbl. of crude represents the increase of the last six months over the first six months. Similarly in the last six months 281,347,717 gal. of gasoline more than in the first six months was produced. Kerosene production increased 69,192,521 gal. in the last six months. The relatively small increase made in the production of kerosene is due to large amounts being run into fuel oil, which shows a substantial increase in production during the last six months.

Between Sept. 30 and Dec. 31 the stocks of gasoline on hand at the refineries increased 43 per cent, or 124,498,271 gal., this being the difference between 287,758,562 gal. on hand Sept. 30 and 412,256,833 gal. on hand Dec. 31. The average gain in gasoline on hand for the last four months of the year was 41,396,090 gal. per month.

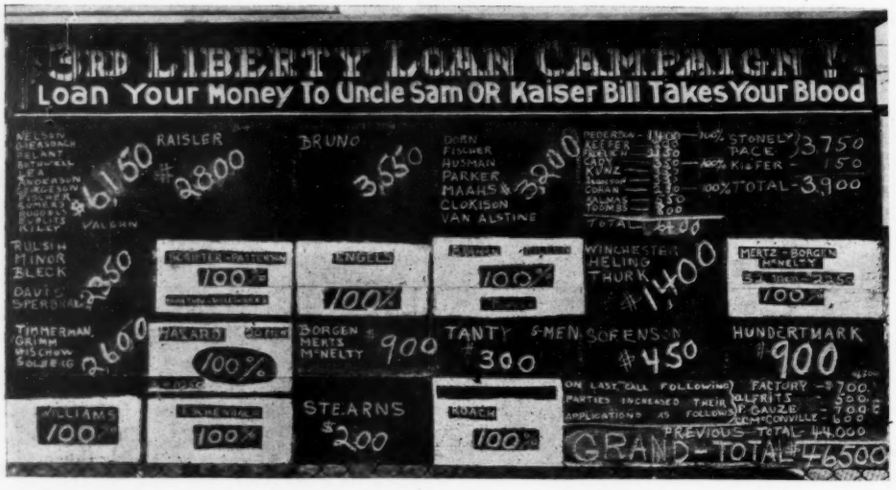
HARTFORD TRADE TAKES $45,000

Hartford, Conn., May 4—Dealers here subscribed as individual concerns to over $40,000 and the Hartford Automobile Dealers' Association subscribed $4,800, so that the total is close to $45,000. Fred W. Dart, Haynes and Mitchell distributer, was chairman of the dealers' committee and he was assisted by Russell P. Taber, Reo distributer, and Ralph D. Britton, Allen and Velie dealer.

F-W-D 300 PER CENT

Clintonville, Wis., May 6—When the Third Liberty Loan campaign closed at the plant of the Four Wheel Drive Co. it did so with the quota over-subscribed 300 per cent. Flag-raising exercises in which the town took part marked the record. A service flag with 187 stars was run up, emphasizing the fact that F-W-D is backing its soldiers and sailors to the limit and more. The drive was under the direction of the sales manager, G. P. Hewitt. Each of the twenty-two departments was divided into sections of ten men each, and a campaign manager was appointed for each section. Eight departments had a perfect score before the campaign closed.

A feature of the campaign was the bulletin board reproduced here. The totals of each department were chalked up twice a day.



Bulletin board used by Four Wheel Drive Co., Clintonville, Wis., in drive

March Exports Increase

Value of Cars, Trucks and Parts Shipped in Month Reaches $8,191,305

80 Per Cent Below Month of March, 1917

WASHINGTON, May 3—While exports of motor cars, trucks and parts during March showed a substantial increase over the February amount, they are still below normal, being only 80 per cent of the total for March, 1917. The valuation of the exports for last March was $8,191,305.

For the nine months ending March 31, 1918, the exports of cars, trucks and parts amounted to $86,093,407, approximately the same as for the corresponding period a year ago. If the value of the airplanes, motorcycles, gasoline engines, tires, magnetos and spark plugs exported is added to the March amount, the value of exports increases to $15,087,310.

In March, 1918, 620 trucks were exported as compared with 765 in February and 1040 in March, 1917. Great Britain and France took 298 of these, and Canada 132. Passenger car shipments increased from 3551 in February and decreased from 5755 in March, 1917, to 4249, the value of which was $3,981,016. South American trade fell off heavily. Argentina took only seventy-nine cars, as compared with 335 in February. Chile took 137 as compared with 191 in February.

Trade with the Orient showed an increase. Also, Australia took 248 cars as compared with 144 in February. British India took none in February but twenty-five in March. Russia, of course, took none, and Norway only one.

During March 10,215 engines, including motor car, truck, marine, tractor, stationary and creeper-type gas engines, were exported. The value of these footed up to $4,420,831, the largest item in the exports. Tires amounted to $934,631 and magnetos and spark plugs, $318,333.

JACKSON MUNITION GETS ORDER

Jackson, Mich., May 3—The Jackson Munition Corp. has received a contract from the Government for machining 1,000,000 75 mm. high-explosive shells and 177,500 155-mm. high-explosive shells. The latter contract will be handled exclusively by this company, but the order for the 75-mm. shells will be manufactured by the following sub-contractors: Jackson Automobile Co., Jackson Cushion Spring Co., Sparks-Withington Co. and the shell division of the Mott Wheel Works.

CANADA TAXES CARS

Montreal, Canada, May 3—The excise tax to be levied on motor cars will be effective as from April 30, 1918, and the tax of 10 per cent will be computed in the case of the imported article upon the valuation for customs entry plus the amount of duty paid and in the case of the article of domestic manufacture upon the manufacturer's selling price. In the case of motor

cars the new tax is made retroactive. That is to say, only motor cars which were imported or manufactured before April 30 and which still remain unsold "to bona fide users" will be subject to taxation.

The report circulated some time ago to the effect that an embargo was to be placed on cars induced many dealers to hurry up their imports for this year, with the result that stocks of American cars now held in Canada by dealers are larger than normal for this time of the year. It is to be noted, however, that the new tax applies only to passenger cars and does not fall upon motor trucks, delivery cars, etc.

NO CHANCE TO DODGE

Cincinnati, Ohio, May 6—When H. S. Leyman was appointed chairman of the U team in the Liberty Loan campaign here he followed up his appointment with the huge sign shown in the illustration on this page. The sign is 90 ft. long and about 70 ft. high, with no chance to dodge it, in short. The building is in the theater and shopping district, and hence a good place to catch the crowd.

BOSTON EXPECTS $500,000

Boston, Mass., May 4—It is expected that when all the figures are compiled next week it will be found that the trade went over the $500,000 mark this time. It was thought at first that the figure would be $300,000, but in the last week the pledges began to come in very heavily and the total mounted up. This is merely from the dealers in cars, trucks and accessories. The tire pledges were counted in with the rubber trade. One of the interesting incidents of the drive was the receipt of $1,500 in ragged bills of small denominations that had been hoarded up for years by an Italian woman, who turned the money over to her son who works in the Cadillac service station after he became enthusiastic following a rally.

CHICAGO TRADE EXCEEDS QUOTA

Chicago, May 6—A resume of Saturday's Liberty Loan drive of the Chicago Automobile Trade Association shows the organization went over the top with a total subscription of $1,852,600, the specified quota being $1,800,000. These figures are not complete, as a careful count has not been made. Saturday morning saw the association over $100,000 behind its quota, but by night $149,000 worth of bonds had been sold. This fact is attributed to last-minute purchasers, characteristic more or less throughout the nation.

The Stewart-Warner Speedometer Corp. was the largest purchaser, with Nelson & LeMoon second. In all there were 15,241 subscriptions, scattered among manufacturers, dealers, employees, etc. The association feels that something like $500,000 to $750,000 was lost in the campaign, owing to members purchasing bonds through outside sources.

CORRECTION

In the Bethlehem Motors Corp. advertisement which appeared in the issue of April 4 the list price of the 2¼-ton chassis was given as $1,950. This price should have been $1,915.

Rubber Import Is Cut

War Trade Board Limits the Amount to 25,000 Tons in Three Months

Curtailment Means 37½ Per Cent Decrease

WASHINGTON, May 3—Rubber imports have been cut 37½ per cent by the action of the War Trade Board in limiting importation to 25,000 tons in a three-month period. No date has been set as to when this three-month period will begin. The cut has been made primarily to conserve tonnage and amounts to the percentage given, taking into consideration average monthly shipments of late.

Following the action to restrict importation of rubber the War Trade Board has ruled that all persons receiving shipments of rubber must sign an agreement giving an option to the Government for the entire consignment at 62 cents per pound for smoked sheets, 63 cents per pound for standard latex crepe and 68 cents for fine para. Persons receiving consignments of rubber are required to agree not to sell at prices higher than those set by the Government. This action has been taken to prevent hoarding and profiteering.

The war service committee of the Rubber Industry of the U. S. A., which is a part of the Rubber Association of Amercia, has sent a letter to all motor car manufacturers urging that commencing July 1, 1918, they use only six sizes of pneumatic tires for passenger cars and three sizes for commercial vehicles.

The schedule which has been adopted by the war service committee includes only the following sizes:

SIZE		RIM
30 by 3½	Clincher	30 by 3½
31 by 4	Clincher	30 by 3½
32 by 3½	S. S.	32 by 3½
33 by 4	S. S.	33 by 4
34 by 4½	S. S.	34 by 4½
35 by 5	S. S.	35 by 5
36 by 6	S. S.	36 by 6
38 by 7	S. S.	38 by 7
40 by 8	S. S.	40 by 8

All these sizes, with the exception of the 36 by 6, 38 by 7 and 40 by 8 conform to the S. A. E. standards adopted July, 1915. One entirely new size, 33 by 4, has been adopted as a regular standard size and is intended as a compromise between the 32 by 4 and 34 by 4. It is pointed out by the war service committee that the adoption of this schedule of sizes by the industry will greatly reduce the amount of stock a dealer must carry and correspondingly increase the service he can give. At present there are approximately 200 sizes in types of tires made in inch sizes as against the nine sizes in the new schedule.

The war service committee also urges the earnest support of manufacturers in the program looking to the standardization of American inch sizes on all export shipments of cars, which will eliminate the necessity for manufacturing and carrying in stock, both in this country and in foreign branches, forty-three sizes and types of millimeter clincher tires.

SAN ANTONIO MAKES GOOD

San Antonio, Tex., May 4—Members of the San Antonio Automobile Dealers' Trade Association purchased $255,000 worth of Liberty bonds. Many of the members also did service as bond salesmen among outsiders with the result that they disposed of more than $25,000 of bonds in this manner.

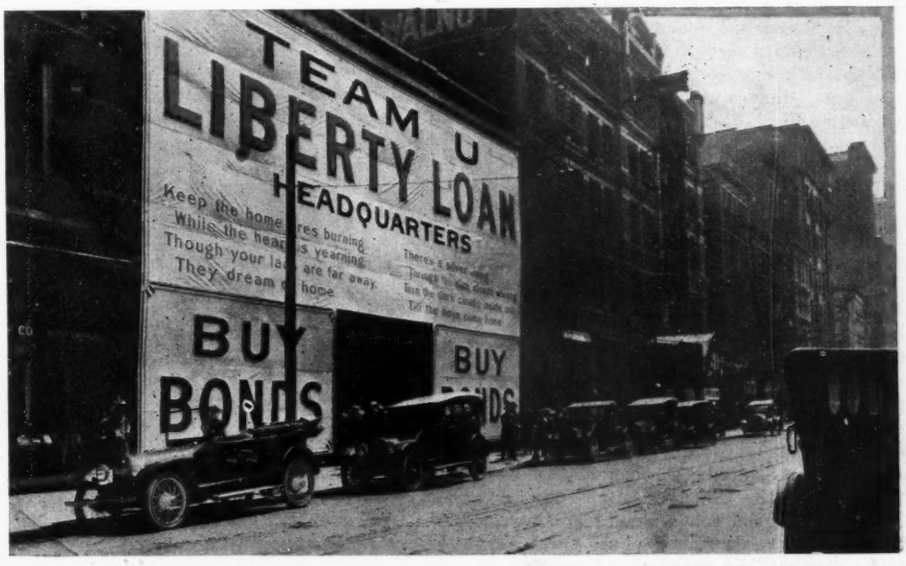
NEW JORDAN PRICES

Cleveland, Ohio, May 3—The latest Jordan models announced are listed at the following prices, effective May 1:

Suburban Seven	$2,375
Sport Marine	2,475
Suburban sedan	2,825
Brougham	3,200
Town car	3,500
Limousine	3,750

GARAGE REGISTERS CUSTOMERS

Bloomington, Ill., May 3—Keeping a sort of hotel register for transient motor cars is the novel scheme which C. W. Frey, Bloomington, Ill., employs to keep track



Immense sign, 90 by 70 ft., erected in front of dealer's in Cincinnati for drive

of his garage service and to prevent "anyone slipping anything over." Mr. Frey does no repairing. He maintains merely a storage garage, which is open day and night, and he performs only such services as washing.

At a wall desk immediately inside the garage is a register which all except regular monthly customers must sign whenever a car is left. This register is column ruled and has columns for the following record:

Name of owner; address of owner; make of car; license number; charge for transient storage; charge for washing; total charge.

As soon as a car is registered, the serially-numbered coupon on the bottom of the identification tag is detached and given to the driver. The upper portion of the tag is attached to the car. No car can be taken out except upon presentation of the coupon bearing the same serial number as that of the tag on the car. Also the charges for service, as shown by the register, must be paid at the same time. The register bears a daily date just like a hotel register and performs exactly the same function.

Mr. Frey's garage is a one-story fireproof brick of attractive design, facing 115 by 138 ft. with entrance on both sides. It has storage capacity for 150 cars. He is agent for the Studebaker car and his showroom, accessory department, stockroom, offices, restroom, etc., occupy one corner of the building.

Incidentally, Mr. Frey has found another advantage from his "hotel register." It provides him with the names and addresses of car owners which he uses as a mailing list for advertising and special announcements.

SHOW WORK IS PUSHED

Chicago, May 5—Workers for the second annual show which is to be held by the Automotive & Accessories Exposition, Inc., in the Municipal Pier Sept. 14-21 got together at a dinner the other night, and the campaign is to be launched immediately. Space sales so far point to the filling of the entire 150,000 sq. ft. of floor space offered by one side of the pier, and an option has been taken on another 100,000 sq. ft. on the opposite side if found necessary. Manager H. V. Buelow opened his offices in the New Southern hotel last Monday and will be actively engaged on show work from now on. Dinners will be held once a week to keep the plans moving and enthusiasm stirred up.

ILLINOIS ROAD BOOSTERS MAY 9

Chicago, May 4—Plans for the educational campaign in behalf of the Illinois $60,000,000 good roads bonds issue will be launched at the meeting at Monmouth May 9, through which fifteen counties are being canvassed. The meeting will be held under the auspices of the Monmouth Commercial Club and the Illinois Highway Improvement Association. The program will include addresses by 4-min. men from each of the counties represented, and many speakers are slated. In connection with the meeting the Chicago Automobile Club is holding a good roads run to Monmouth, to occupy three days, one of the three days to be spent in the parades and meeting at Monmouth.

Tractor Wheel Report

Research Is Made as to Resistance in Soft Soil Through Experiments

Local Conditions Called Big Factor in Tests

MINNEAPOLIS, Minn., May 3—Report of progress up to May 1 in research pertaining to the resistance to rolling of tractor wheels in soft soil was the chief feature of the last meeting for the season of the Minneapolis section of the Society of Automotive Engineers Wednesday night. The report was read with accompanying slide charts by Amos F. Moyer of the experimental engineering department of the University of Minnesota. Dean J. R. Allen of the university engineering department discussed foreign trade opportunities for the United States and G. M. Gillette, vice-president of the Minneapolis Steel & Machinery Co., spoke.

Tribute was paid by various members to the worth of the experiments by Mr. Moyer. It was decided to continue the work to which both the university and the section have contributed. Prof. J. L. Mowry offered to assist in further development of the theory, and Field Secretary R. R. Plimpton urged members to help out as much as they can in the work, which requires early completion owing to the need for expressional formula for all varieties of wheels.

Mr. Moyer said the work is only fairly begun. Field tests are necessary. Thus far the progress has been theoretical work and is preliminary to the subject of traction. He said test is being made first of the smooth tire wheel before the lug wheel is taken up. In reply to the query of Chairman H. C. Buffington as to how far this work may be carried on before some valuable formulae are arrived at to work out various problems the speaker said it was found some conditions were exactly the reverse of what had been forecast, so that it cannot be told just when valuable expression for resistance to rolling tractor wheels will be found, but field tests are essential to reach a result. Wheels of various diameters should be utilized. Attention must be paid to soil conditions.

Professor Mowry said tests must be made in one section and in another section to meet different soil conditions. A. W. Scarratt said the mechanical form of grip should be considered and when the tests get into the lug type of wheel then data will be reached which will be valuable to tractor builders. It was suggested that various sods should be tested. Mr. Plimpton suggested copies of the paper should be sent to other engineers to get their ideas.

Mr. Moyer discussed first the development of the theory. The freshly-tilled, sandy and black loam soil used in the experiments are not only capable of molding in form, but are slightly compressible. The yielding properties appear to be due to lateral movement under vertical pressure to a much greater extent than to compressing any given amount into smaller volume. Mathematical derivations to verify are based on the assumption that soft soil and probably other plastic materials bear up a unit of pressure disproportionate to the depth of depression. This is equivalent to saying the total weight borne up is disproportionate to the volume perpendicularly inclosed by the displacing surface in actual contact with the substance and below the surface from which the substance was displaced. In case of a hard cylindrical body rolling on a level plastic surface this volume consists of the prismatic half segment of the cylinder below the level surface and on the forward side. If the deformation body in place of being a cylinder were rounded up in front and continued flat for some distance backward to rest in contact with the bottom of the track like a sled runner or creeping tread, the supporting volume of displacement would include also the rectangular prism extending backward a distance equal to the flat supporting surface. This illustrates the much greater carrying capacity which characterizes surfaces of this kind.

Flat-tired Wheels

Through the experiments attention has been confined to plain flat-tired wheels of varying weight, width and diameter. According to the principle of the conservation of energy the work done on rolling a wheel a given distance is equal to that expended in depressing soil over the same distance.

To verify paper deductions it was necessary to provide a course where conditions could be duplicated as nearly as possible to obtain many comparative readings. The only condition of quick duplication seemed to be freshly-tilled soil, making possible repeated use of the same bed. This suggested use of a stationary dynamometer to measure the pull required to move loaded wheels by means of ropes. The soil bed was at first 3½ ft. wide and later widened to 6 ft. 8 in. of sandy black loam with enough moisture to avoid dust and ball slightly in the hand.

All tests up to date have been conducted on the same soil in approximately the same condition. Unavoidable differences between readings necessitate averaging results from several runs or taking data from intersections of mean lines in the manner described in charts. The results from spading by no two men will agree and the man often cannot check himself, but nevertheless the speaker said he feels that the proof of the laws which exists between the quantities involved will be of the utmost assistance when supplemented by such actual field data as can be made universally applicable to the needs of engineers.

Dean Allen spoke from actual experience of buying American goods in various countries of the world and he held up to the American manufacturers great opportunities if certain well-defined rules are used as a basis of their operations. He showed that American-made goods are better than those from England and Germany. Turkey furnished the main facts for the talk. He said the American is the poorest exporter in the world, although he mentioned three firms whose goods are found everywhere, even miles from civilization. An Amer-

One of the huge pneumatics used by Goodyear, and, above, the trucks

ican will not obey orders, often failing to furnish the necessary certificate of origin, which is required for importation in some countries.

Mr. Allen said:

"Be sure you do exactly as you are told.

"A catalog without prices is useless.

"Study the market. Turks use saws that pull up and planes that pull to and adzes to drive nails. You must bargain with them to make sales.

"You have got to put money into the business to make it stable. Once a customer always a customer is the rule. Once built up, the markets must be maintained.

"Have an agency in each of the principal countries. Have an American manager but salesmen that know each country and talk the language—not American salesmen.

"Our manufacturers must combine in foreign trade and have a combined sales force.

"Pack and ship goods according to instructions. The American packer is the best on earth. Pack goods so they can roll down hill without injury.

"In the automotive line Turkey is just waking up, to automobiles, tractors and motor boats. Turkey is a great agricultural country and must go into the business in a serious manner."

ADVANCE-RUMELY PLANS WORK

Battle Creek, Mich., May 3—The Advance-Rumely Co. will manufacture 3000 Oil-Pull tractors this summer, as well as make boilers for the United States shipping board, and continue its usual program of manufacture. This will mean the immediate employment of fifty more boilermakers and an addition of 800 mechanics very shortly.

Goodyear Fleet Reaches Chicago

Five Trucks from Akron to Carry Loads to Seaboard

CHICAGO, May 3—The detachment of five trucks from the Goodyear Tire & Rubber Co.'s fleet reached Chicago Wednesday after being 25½ hr. in making the 440-mile trip from Akron, Ohio, a record that surpasses prevailing railway freight schedules.

The trucks brought tires, tubes and other accessories to the local Goodyear branch. They were met by delegations from the Chicago Association of Commerce, the Chicago Automobile Trade Association and the Traffic Club with a band, and a procession proceeded down Michigan and over Jackson boulevard to the Board of Trade building.

A 1½-ton Packard, 3-ton Packard, 5-ton Packard, 3-ton White and 3½-ton Mack were in the fleet. The trucks spent Wednesday night in Grant park under a guard from the Great Lakes Naval Training Station and yesterday morning started on a trip to Baltimore by way of Washington. They are carrying 16 tons of Red Cross hospital supplies for immediate shipment to France. The goods consist of those which have been delayed for several weeks because railroad transportation could not take care of them. A complete field kitchen, capable of serving 400 men at the front, is included.

The giant Goodyear pneumatic cord tires, the largest of which are 44 by 10 in., attracted much attention while here.

HOW IOWA WILL DISTRIBUTE

Dearborn, Mich., May 6—An extensive plan of distribution of Fordson tractors has been prepared by the Herring Motor Co., Des Moines, Iowa, to whom the 1000 tractors have been consigned by Iowa. In addition to the publicity matter which the local papers carried a coupon was used to encouraged replies. Many of these were received by the distributer. A letter also was sent to all the Ford dealers in the state. There are from two to four Ford dealers in every county in Iowa. Co-operation was secured between these dealers and the farm crop agent of each county and the county chairman of the Council of Defense. Orders are being filled according to priority; shipments are going to every county seat town in the state. Ford dealers in the county are asked to assist in the delivery. Only farmers who are recommended to the distributer by the county agent will receive tractors.

TRACTOR SALES BY DEALERS

London, England, April 15—The sale of farm tractors throughout Great Britain seems now certain of being handled practically exclusively by motor car dealers. Exclusive dealers in agricultural machinery are very few in England, Scotland, Wales and Ireland, and the original agricultural people having largely merged into the motor business in the past years, the sentiment is strong throughout the British Isles that as the motor car dealers are taking care of the truck business and the repair shop business that it would be a lack of economy to equip similar lines of repair shops for farm tractor work.

FORDSON ON GENERAL MARKET

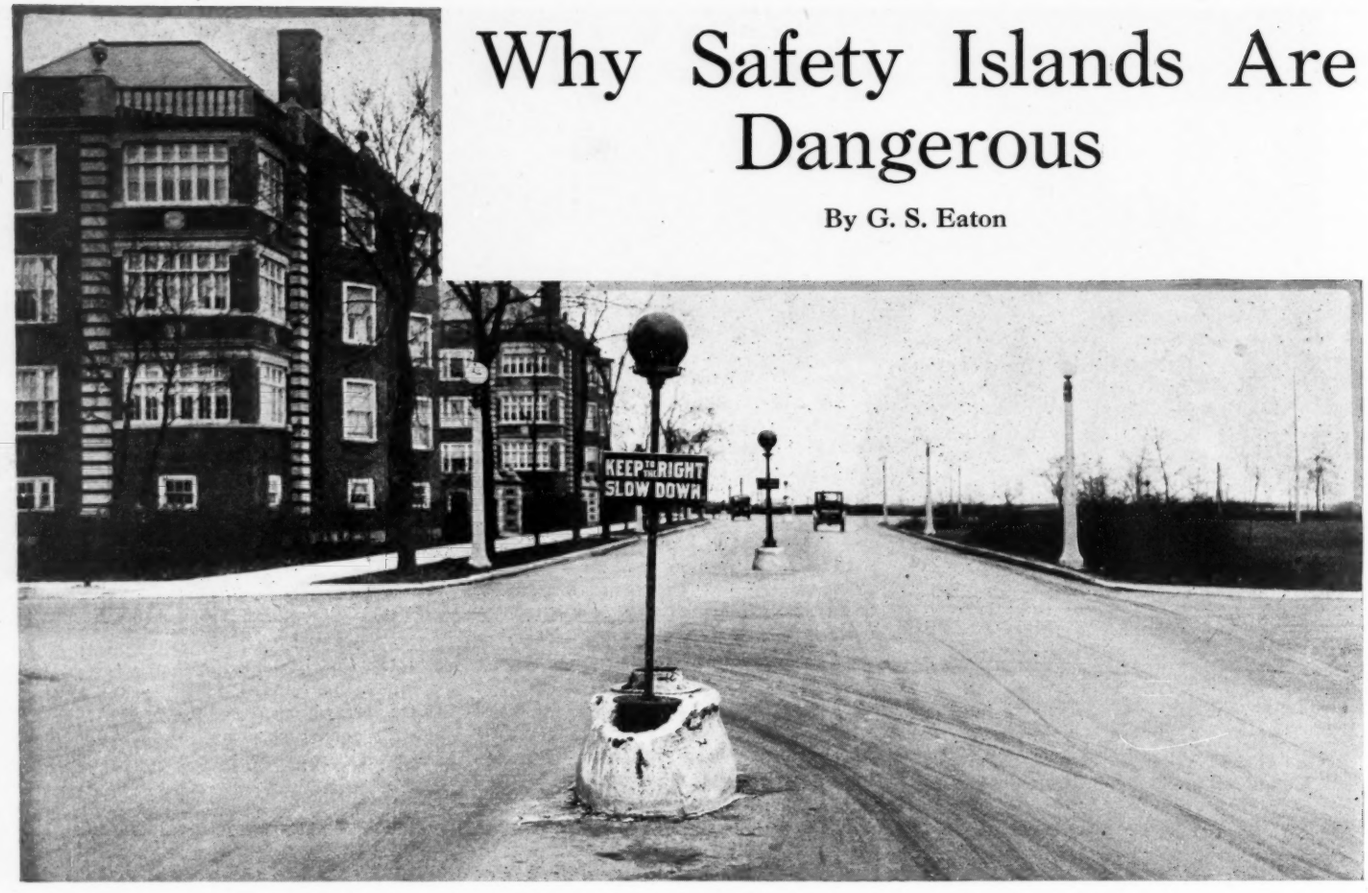
Dearborn, Mich., May 6—The placing of the Fordson tractor on the general market was actually started this week. The local agencies must keep a supply of parts and accessories for the tractor, and the service system is a duplicate of the Ford service system. To educate prospective dealers and others who will handle the tractor, the agents are sending young men to the Fordson plant, where they are being taught assembling from start to finish, so that they will be thoroughly familiar with the construction of the Fordson tractor.

Henry Ford & Son are advertising in many city papers for skilled and unskilled labor. It appears that they are unable to obtain anywhere near the number of men needed.

One hundred tractors have been sold to the Cuban government; also 100 to Wisconsin.

Why Safety Islands Are Dangerous

By G. S. Eaton



Safety island at Sheridan road and Belmont avenue, Chicago, after one of many smashups

MOTORISTS are usually aware of the danger in the ordinary street island of safety. That this danger is real has been proved again and again by collisions with the poorly illuminated but substantial barriers which are called safety islands. If motorists as well as pedestrians are to be protected, these barriers must not only be substantial but plainly visible day and night, and as near collision-proof as possible.

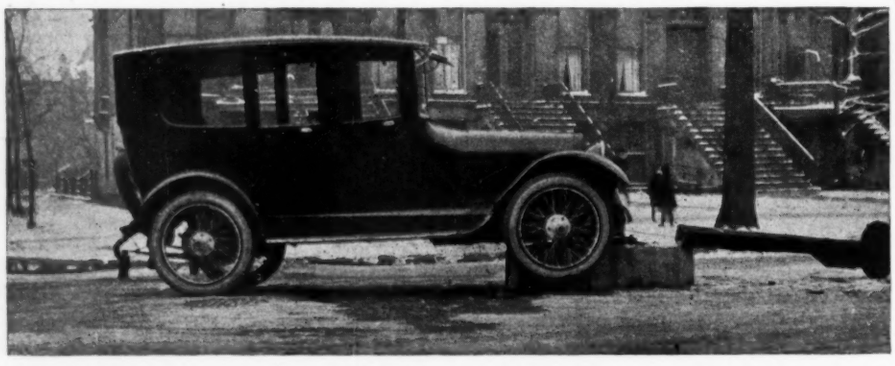
A short tour made some weeks ago over a few of Chicago's North Side boulevards showed two broken island lamp posts. At a third island it had been necessary to replace both platform and post just a few days before. On the boulevards under the control of the South Park commissioners there are 153 safety islands. Here care was taken earlier than in other parts of the city to make the islands more plainly visible by painting them white. Yet 270 accidents, ranging from breakage of the globe to the complete demolition of the post and even of the platform itself, is a year's record as given by J. F. Foster, general superintendent.

What often happens is seen in the illustartion showing the motor car with its hood resting on an island platform. This photograph shows an accident at one of the islands under the jurisdiction of the West Chicago Park commissioners who have not yet followed the action of the South Park commissioners, and recently of the Lincoln Park commissioners, in having their island lamp posts painted white. Like many others, this particular accident is hard to explain. But the lamp post is gone, and in such an accident it is scarcely possible for the car, its occupants or persons seeking safety on the island to escape serious injury.

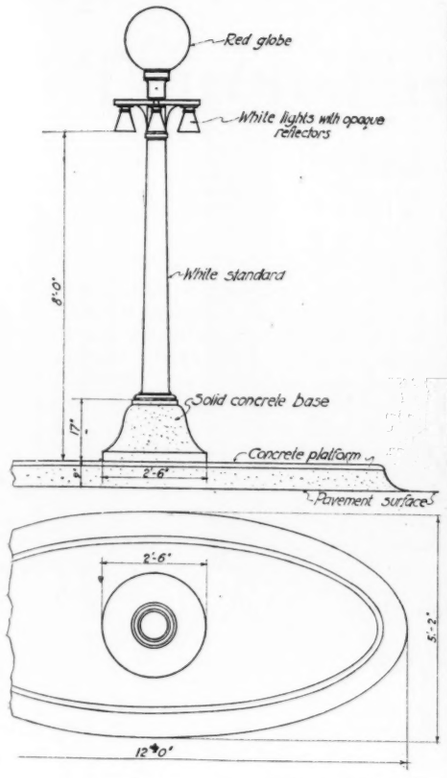
From the frequency of accidents, it is evident that the safety of both motorist and pedestrian has been poorly provided for, not through design, doubtless, but because of failure to foresee how the island a block away will appear to the driver as he approaches it at night. Instead of finding before him a black post, almost invisible, rising from a platform of indeterminate extent, he should see a white post and base well illuminated. There must be no glare to blind him. Small white lights shielded by opaque reflectors just below the red signal will furnish the illumination needed. On top a red globe adequately lighted will warn the driver of danger and remind him to keep to the right and slow down.

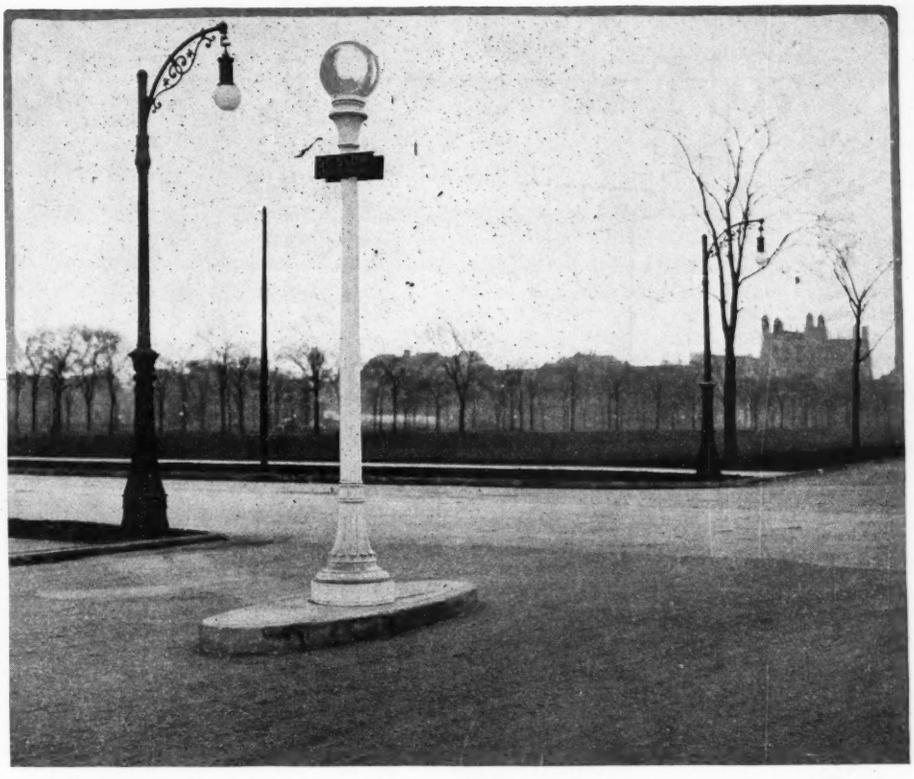
Even though the island is well lighted, a car may be forced into this substantial obstacle to avoid collision with a recklessly driven car or with some luckless pedestrian. On slippery pavements, skidding into the plattorm is responsible for many accidents. Shaping the island so that it will turn aside any but a car hitting it head-on, will be effective in promoting safety.

If the pedestrian seeking refuge is to be protected, a car striking the island squarely must be stopped, stopped, if possible, without breaking the lamp post and shattering the globe, so that danger from the falling post and flying glass will not make matters worse. Experience has shown the necessity of setting the platform well



One more lamp post gone—Jackson and Ashland boulevards, Chicago





White post and platform, plainly visible. Left, recommended safety island design

into the pavement; otherwise a heavy car may displace the whole island. The latest type of island adopted by the South Park commissioners Chicago, is a formidable barrier but not so effective as might be in veering off glancing blows, nor is it of pleasing appearance.

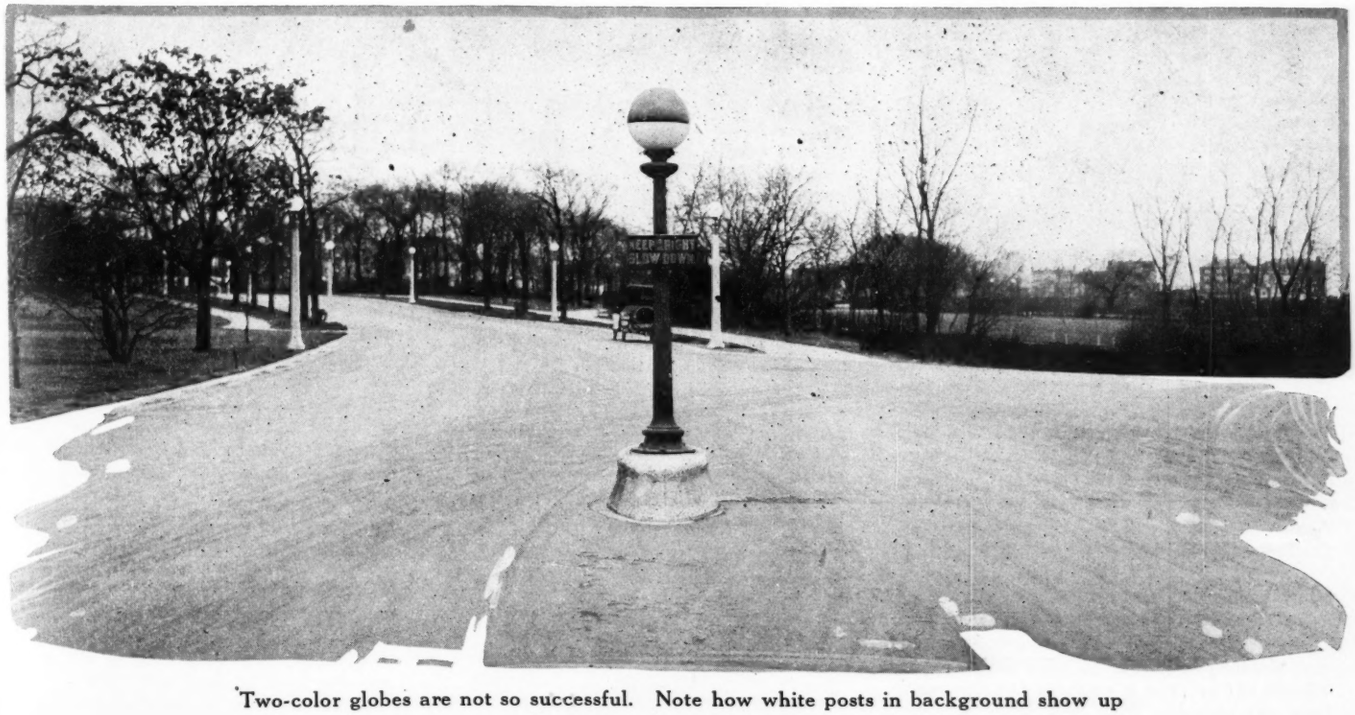
Shape, color and illumination, then, are important features in safety island design. Thought was given these points in working up the accompanying drawing, which serves to illustrate the design of a safe island of safety.

If safety islands are so dangerous, why have them at all? They are needed to serve these two purposes—to offer adequate protection to pedestrians who must cross thoroughfares and, by fixing lines of traffic as well as by indicating danger points, to minimize collisions and congestion.

False Security

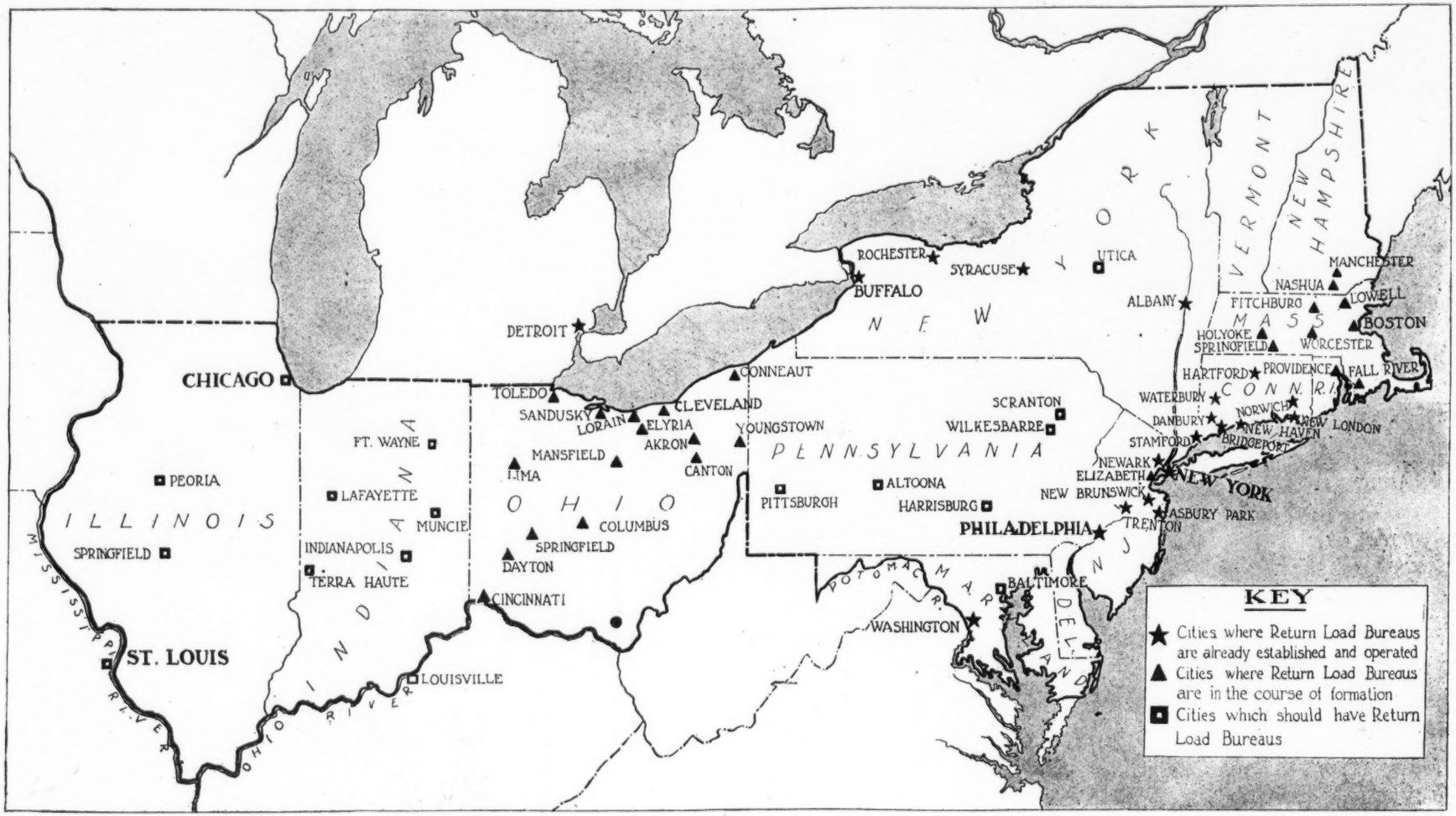
Pedestrians crossing a wide and busy street find real protection only when the island is so constructed that a vehicle cannot pass over it. Otherwise a false sense of security is felt. A heavy lamp post is especially satisfying to the person standing between lines of swiftly moving motor cars. Yet this apparent safeguard may prove a danger instead if set on a low, narrow platform, so that it can be struck easily. Flying glass, if not the post itself, may injure those near it.

On heavily traveled boulevards and streets where motor cars move at high speeds, safety islands may be needed to control traffic even more than to protect pedestrians.



Two-color globes are not so successful. Note how white posts in background show up

Map of Return Loads Bureau Development



The area in which it is planned ultimately to establish statewide return loads bureaus extends clear east from the Mississippi and north of the Ohio and Potomac rivers to New England. This territory includes the states of Illinois, Indiana, Ohio, Pennsylvania, Maryland, Delaware, New Jersey, New York, Connecticut, Rhode Island, Massachusetts, and the lower portions of Vermont and New Hampshire. As will be noticed, those bureaus actually established are so far along the Eastern seaboard. Connecticut is the only one with a statewide organization at present actually in operation.

Thirty-Three Truck Bureaus Now

Five States and District of Columbia Have Established Return Loads System

WASHINGTON, May 3—Thirty-three return loads bureaus are now established and in operation in five states and the District of Columbia. Fifteen are in Connecticut, ten in New Jersey, five in New York, one in Pennsylvania, one in Michigan and one in the District of Columbia. Eventually return loads bureaus will be established in the entire territory east of the Mississippi and north of the Ohio and Potomac rivers. As shown in the accompanying map, this territory includes Illinois, Indiana, Ohio, Maryland, Delaware, Pennsylvania, New York, New Jersey, Connecticut, Rhode Island, Massachusetts and the lower halves of Vermont and New Hampshire.

While for the last several months the Highways Transport Committee in Washington has been confining its efforts to the establishment of return loads bureaus along the eastern seaboard, since the greatest congestion will result in that territory, the necessity for such bureaus is now being felt farther west, where during the last week the first bureau in Michigan was established in Detroit.

The greatest development of the idea during the last three weeks has taken place in New York and New England. In New York bureaus have been established in New York, Albany, Buffalo, Rochester and Syracuse. In New England, the New England Highways Return Loads Association, which was formed in Providence April 18, has progressed in its work and will soon inaugurate bureaus in all of the large industrial centers of Rhode Island and Massachusetts to link up with the successful return loads bureau organization already established in Connecticut.

What Bureau Is

The return loads bureau is a means whereby the manufacturer or shipper of goods may get in communication with motor truck men or motor truck concerns capable of transporting goods over the highways to the end that the railroads may be assisted in moving short-haul freight and that the trucks may run fully loaded at all times. Due to the acute railroad congestion, which existed in practically all parts of the country during the last winter and spring, and particularly in the East, many merchants and wholesalers have been forced to keep goods on their platforms because they could not be shipped by railroad and because they were unable to get in communication with concerns or individuals capable of carrying goods overland by motor trucks. The return loads bureaus eliminate this difficulty by getting the shipper and the truck man together. This is accomplished by listing both the manufacturers who have goods to ship and the trucking concerns prepared to handle such goods on ordinary file cards in the bureau office. The bureau thus acts as a clearing house between the two classes of individuals. If a motor truck man calls up the bureau to inquire what concerns in any particular locality have loads going to any other point, the secretary in charge of the bureau will give him the names of two or three manufacturers who might have loads to be carried over the routes over which the truck man usually operates his vehicles. Similarly, if a manufacturer having goods to be shipped over any particular routes calls up the bureau, the secretary will advise him of several trucking concerns capable of moving the goods.

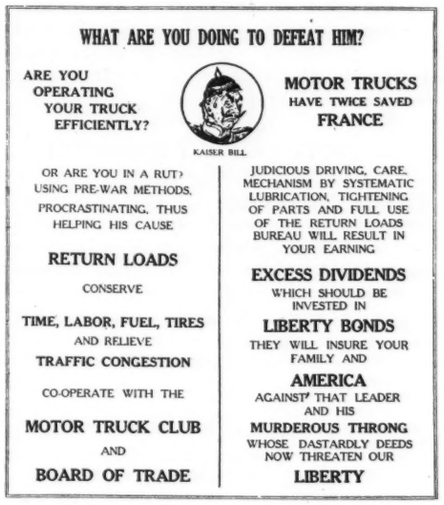
The main purpose of the bureau is simply to get the truckman and manufacturer together, leaving to these two individuals the questions of the charges for the work to be done and for the responsibility for goods if damaged while en route. While it has not so far been the policy of the return loads bureaus to assume responsibility for the goods handled by truckmen listed at the bureau, the latter is requiring in some cases that the truckman carry blanket insurance on the goods or be bonded for the value of the average load in addition to the presenting both bank references and one or two from manufacturers for whom the truckman previously has transported material.

The work of getting the manufacturer of goods into communication with the truckman or haulage concern which sells transportation as a business is only a smaller portion of the bureau's work, since it can also be of assistance in enabling manufacturers who deliver their own goods by motor truck to bring back on their return trips full loads to their own plants or two other companies in the same vicinity. Statistics have shown that the average motor truck owned by concerns which make their own deliveries operates at approximately a third of its maximum efficiency. Since the average truck has a capacity of 1½ tons and usually makes three trips a day, the maximum possible daily tonnage which could be hauled would be 4½ tons. When it is considered that there are approximately 400,000 motor trucks in service today, the total daily tonnage which could be carried by our motor trucks if they hauled full loads on both the outbound and inbound trips would amount to the astounding figures of 1,800,000 tons.

Motor Truck Tonnage

As compared with this total, the tonnage actually hauled by motor trucks is only 600,000 tons. It is, of course, impossible for this ideal condition of full loads both ways to be attained, for the reason that many of the trucks are engaged in retail delivery work, where the entire load is not delivered in some cases until the truck has practically returned to its starting point.

Still the return loads bureau idea would prove of inestimable service to the Nation if it increases the motor truck tonnage only 50 per cent of the ideal possible tonnage, or 600,000 tons a day, or 180,000,000 tons in a 300-day year. During the year ending Dec. 31, 1916, the last year for


WHAT ARE YOU DOING TO DEFEAT HIM?
ARE YOU OPERATING YOUR TRUCK EFFICIENTLY?
KAISER BILL
MOTOR TRUCKS HAVE TWICE SAVED FRANCE
OR ARE YOU IN A RUT? USING PRE-WAR METHODS, PROCRASTINATING, THUS HELPING HIS CAUSE
RETURN LOADS
CONSERVE
TIME, LABOR, FUEL, TIRES AND RELIEVE
TRAFFIC CONGESTION
CO-OPERATE WITH THE
MOTOR TRUCK CLUB
AND
BOARD OF TRADE
JUDICIOUS DRIVING, CARE, MECHANISM BY SYSTEMATIC LUBRICATION, TIGHTENING OF PARTS AND FULL USE OF THE RETURN LOADS BUREAU WILL RESULT IN YOUR EARNING
EXCESS DIVIDENDS
WHICH SHOULD BE INVESTED IN
LIBERTY BONDS
THEY WILL INSURE YOUR FAMILY AND
AMERICA
AGAINST THAT LEADER AND HIS
MURDEROUS THRONG
WHOSE DASTARDLY DEEDS NOW THREATEN OUR
LIBERTY

Advertisement by the Motor Truck Club of New Jersey of the return loads bureau idea in which the work of the bureaus is linked up with fight to whip Kaiser Bill

Return Loads Bureaus

NEW YORK

Albany.....Chamber of Commerce
Buffalo.....Chamber of Commerce
New York City.....Merchants' Assn.
Rochester.....Chamber of Commerce
Syracuse.....Chamber of Commerce

CONNECTICUT

Bridgeport.....Chamber of Commerce
Bristol.....Chamber of Commerce
Danbury.....War Bureau or C. of C.
Greenwich..... War Bureau
Hartford.....Chamber of Commerce
Manchester..... War Bureau
Meriden.....Chamber of Commerce
Middletown..... War Bureau
New Britain...Chamber of Commerce
New Haven.....War Bureau
New London.....War Bureau
Norwalk..... War Bureau
Norwich.....Chamber of Commerce
Stamford.....Chamber of Commerce
Waterbury..... War Bureau

NEW JERSEY

Asbury Park, Board of Commissioners
Carney.....State Council of Defense
Dover.....Chamber of Commerce
Garfield..... Police Station
Jersey City....Chamber of Commerce
Millville....Maurice River Trans. Co.
Montclair..... Police Department
Newark....Motor Truck Club of N. J.
New Brunswick, Home Defense League
Trenton.....Chamber of Commerce

PENNSYLVANIA

Philadelphia...Chamber of Commerce

MICHIGAN

Detroit.....Chamber of Commerce

DISTRICT OF COLUMBIA

Washington....Chamber of Commerce

which the records are complete, the entire railroad system of the Uuited States tranported 2,418,676,023 tons of freight. If the 50 per cent increase over our present ideal maximum carrying capacity could be secured, it would thus amount to approximately 8 per cent of the tonnage of the railway. This 8 per cent seems insignificant until it is realized that it is just such short-haul freight as motor trucks can best transport that always has proved unprofitable for the railway, and which they will now gladly turn over to the motor truck, since they have more of the dividend-paying long-haul shipments than they can take care of.

While there seems to be a general spirit of optimism that the railroad congestion will decrease during the coming fall and winter on account of the Government ownership and operation, close students of the transportation problem believe that the congestion will be worse this winter than it was last. They base their contention for this belief on the ground that the excess tonnage to be moved to the eastern seaboard to supply our armies overseas will more than offset any increased efficiency on the part of the railroads.

A Director Needed

The further development of the return loads bureau idea throughout all New England and in Ohio, Michigan, Indiana and Illinois eventually will make it necessary that some Government director be appointed to co-ordinate the work of the various bureaus in order that the maximum results may be obtained from the efforts expended. Such a director undoubtedly should work in conjunction with the Highways Transport Committee in Washington, since that committee has been responsible for the idea and has brought it to its present state of development. The need for such a director is already being felt in New York, where the bureau formed in New York City has gone ahead in its work without reference to that being conducted by the State Council of Defense to form bureaus in the upper part of the state such as Buffalo, Rochester and Syracuse and in the Hudson River valley between Albany and New York, where bureaus are necessary to increase the value of similar bureaus already established in Connecticut. The work of all these bureaus could be co-ordinated by such a Government director, who should assist the various bureaus in working out their difficulties and in providing duplicate listings for nearby bureaus in other states, so that the manufacturers readily could get in touch with the truck man in adjacent states for bringing loads in or taking them out as the necessity arises.

The most promising feature in the development of the return loads bureaus aside from the actual establishment of the bureaus themselves has been the realization on the part of the highway officials in New York and Massachusetts that the main highway must be cleared of snow if the bureaus are to operate successfully. New York has appropriated $1,000,000 for the maintenance of its main cross-state route between Buffalo and New York and for the purchase of equipment and hiring of labor to keep it clear of snow during the coming winter. Similarly, Massachusetts also has appropriated several hundred thousand dollars for the same work. Connecticut proved during the winter of 1917-1918 that it is necessary for the state to be responsible for snow removable work, since the various small counties or townships which have been responsible for the work in the past have not had the funds, equipment or ability necessary to carry on the work properly. This has resulted in many uncleared gaps in a main route which prevented continuous motor truck traffic almost as effectively as if none of the route had been cleaned.

ILLINOIS TRUCK COMMITTEE

Chicago, May 6—The State Council of Defense has enlarged its highways transport committee from five to fourteen members as the first step in establishing what may develop into return loads bureaus over the state. At any rate the committee is going ahead to make an organized effort to bring about a real motor truck freight system in Illinois. The following are the new members, all of Chicago: W. G. Edens, president Illinois Highway Improvement Association; J. H. Winterbotham, Mid-West representative of the Council of National Defense; H. M. Allison, Packard Motor Car Co.; Henry Paulman, Pierce-Arrow Motor Car Co.; G. A. Freeman, Walker Vehicle Co.; L. A. Busby, Chicago Surface Lines; J. T. Stockton, Stockton Transfer Co.; and J. F. Davis, Winton Co.

DORT OFFERS NEW MODEL

Chicago, May 6—The Dort Motor Co. is offering a new model of its Fleur-de-Lys roadster which is a three-passenger. The lines of the new model are changed considerably, in the sill curve at the rear particularly. The divan is wider, and there is more leg room. Standard color is gray with white stripe below sill. The chassis is fitted with the new 3½ by 5 engine and other refinements brought out in January.

SALES MANAGER TO MEET

Chicago, May 6—The sales managers' department of the National Implement and Vehicle Association will meet here May 15 at the Hotel LaSalle. A report of the eliminations in the farm-operating equipment lines which the several trade departments of the association have agreed to, and have reported to the commercial economy board of the Council of National Defense at Washington, will be placed before the sales managers for their consideration.

WAR SAVINGS MAY 11-18

Chicago, May 6—May 11-18 is Illinois war saving pledge week. During that time an attempt will be made to have everyone sign a pledge to buy war savings stamps regularly during 1918. The slogan is "Pledge for all you can carry—and carry on."

COUNCIL FAVORS RURAL TRUCKS

Washington, May 3—Reasons why rural motor truck express lines should be established all over the country are given in letters sent out to the state councils of defense by the National council. The Highways Transport Committee some time ago investigated the operation of such lines over the main highways surrounding the population centers and as a result found the following war advantages that result from such service:

1—Production is stimulated. Farmers invariably increase the variety and quantity of their production when regular marketing facilities are made available. In every section studied, a great increase in the variety and the amount of production followed the establishment of the rural express.

2—The farmers are relieved of their task of hauling their products to market, and the existing farm labor supply is thereby greatly conserved. The investigation shows that in some places the hauling done by five men with wagons can be done by a man with a truck at many times the speed. This leaves the farm laborers at work in the fields.

3—Additional food is made available by tapping the farm communities which have no other good shipping facilities. Much of this additional food is now either wasted or greatly deteriorated because of poor shipping facilities.

PONTIAC SUBSCRIBES $597,600

Pontiac, Mich., May 6—At the close of the Third Liberty loan campaign the total subscriptions here reached $1,446,900, of which much was subscribed by motor car and allied industries, as shown by the following list:

Wilson Foundry Co.	$200,000
Oakland-Northway plants	179,350
General Motors	130,000
Hess-Pontiac Spring Co.	31,000
Olympian Motors Co.	24,000
Michigan Drop Forge Co.	8,000
Monroe Body Co.	8,250
Monroe Motors	5,300
American F. & S. Co.	6,100
Precision Casting Co.	2,950
Hubbard Spring Works	1,700
Pontiac Paint Co.	850
Pontiac Foundry Co.	400
	$597,600

VACUUM SYSTEM DECISION

Chicago, May 6—That the Stewart-Warner patents on the vacuum feed system are valid but are not infringed by the Thermo vacuum system, was the substance of the decision handed down April 20 by Judge Sanborn in the United States district court for the northern district of Illinois. Stewart-Warner will appeal and endeavor to show that the Thermo system is an infringement.

MEMPHIS SUBSCRIBES $85,000

Memphis, Tenn., May 6—Special telegram—Memphis motor car firms aside from personal subscriptions subscribed between $85,000 and $90,000 to the Third Liberty Loan.

SERVICE RENDERED BY TRUCKS

Toledo, Ohio, May 6—John N. Willys, president of the Willys-Overland Co., estimates that 500,000 commercial vehicles are now in operation in America, that the average capacity of these cars is 2 tons and that they average 50 miles per day, or an annual ton-mile daily capacity of 50,000,000 and 15,000,000,000-ton miles for a year.

Indiana Roads Between Markets

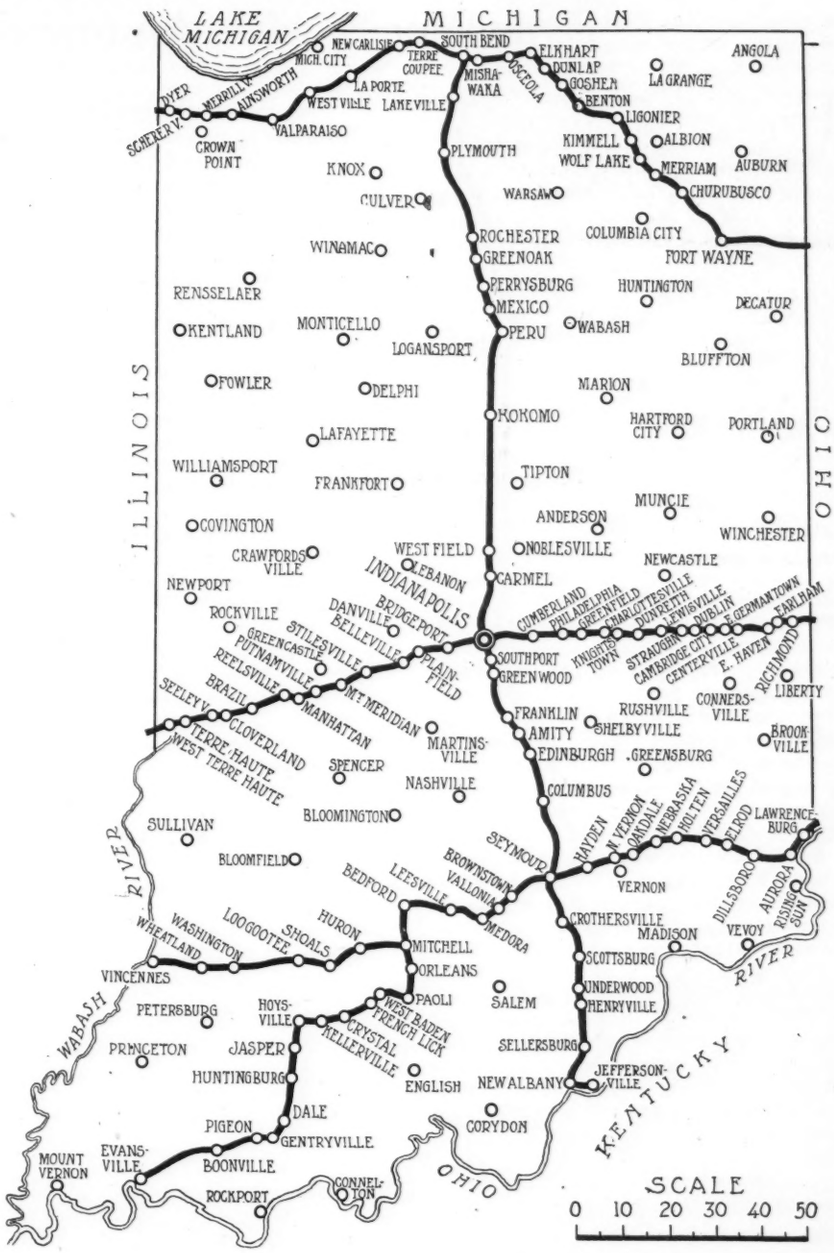
INDIANAPOLIS, Ind., May 3—Given Federal approval, the state highway commission of Indiana can build approximately 200 miles of road this year. Since its organization June 4, 1917, the commission has designated the roads shown on the accompanying map as main market highways. This was done after thorough inspection and investigation of the different roads of the state and was one of the duties allotted to the commission. The five roads form a continuous and connected system of highways 898.6 miles long and are to be added to from time to time. The improvement will be undertaken with a view to a uniform system of highways connecting the main market centers. All such roads are to be hard-surfaced with the paved portion not less than 18 ft. wide with two 6-ft. beams, making the roadway 30 ft. between ditches.

In addition to this system of main market highways Indianapolis is the hub for a trucking system which is to serve the territory within a radius of 50 miles by motor. The Intercommunity Transfers Terminal Co. has been organized for this purpose and with the assistance of the Hoosier Motor Club and Robert E. Springsteen, Indianapolis postmaster, has worked out the routes and methods of operation. Daily service will be maintained between twenty cities. The trucks will be owned by men living in the terminal cities, who will start early every morning for Indianapolis, arriving between 11 and 12 o'clock, and return between 2 and 3 o'clock.

This trucking system is not for freight or express but for emergency shipments. It will serve 1000 grocers, 327 meat markets and 310 confectioners every day, in addition to other lines of business, as a direct connection between the wholesaler and retailer and commission man.

The trucks will pick up loads on the roads enroute to Indianapolis. The Terminal company is to provide loads for the return trips, acting as agent for the truck owners. Auxiliary trucks are to be maintained by the Terminal company for emergency and heavy traffic. The company also will give road service to the owners and care for them in Indianapolis.

It is planned to enlarge the system from time to time and broaden the circle surrounding Indianapolis. Chicago, Louisville, St. Louis and Columbus probably will be the limits of the next system. It has ben decided definitely that a trucking route will be maintained between Indianapolis and Cleveland.



Map showing main market highways of Indiana outlined by the state

FROM VIRGINIA TO WASHINGTON

Washington, May 3—Three routes for rural motor express service between Virginia and Washington have been worked out by the local food administration and the president of the Washington chamber of commerce to begin May 4. It is planned to have the motor trucks leave the Virginia terminals early each morning, reaching Washington at noon and returning the same day over the same route, covering a total distance of 80 miles per day. Under this plan it will be possible not only to carry produce to the city but also to deliver city merchandise to the farmer.

BOSTON-TO-NEW-YORK TRUCKS

Boston, Mass., May 3—One of the overland trucking concerns is the Cressy Contracting Co., which runs on regular schedule between here and New York, 250 miles. At least two trucks leave once a week, and that many make the return trip. The company has twelve trucks, six 5-ton Packards, five 5-ton Pierce-Arrows and one 2-ton Autocar.

One truck leaves Boston Tuesday morning morning about 8 o'clock and the other leaves Thursday morning. A 36-hr. service between the two cities is guaranteed. The trucks have a 24-hr. schedule in which the truck that leaves Boston Tuesday morning arrives in New York Wednesday morning, delivers its load, gets a return load and starts back to Boston Thursday morning. The truck leaving Boston Tuesday runs Tuesday and Tuesday nights with stops only for meals. The first trip was made Dec. 5, 1917. Two trucks, each with 6 tons of merchandise, made the first run to New York in less than 24 hr. The minimum shipment is 500 lb. The rates are 1½ cents a pound, or $30 a ton, which allows for picking up and delivering the goods.

France Trains Motor Drivers

Experiences with Americans at Wheel

By W. F. Bradley

Motor Age War Correspondent in France

THE motor car having been perfected to such an extent that the driving of it is quite an easy matter and one well within the capability of any intelligent man or woman, there is a general impression that no care need be exercised in the selection of men or officers for truck convoys or staff car work. Every nation has made the mistake of underrating the technical knowledge required to handle motor cars under war conditions; even America, possessing a greater portion of car drivers than any other nation and having no necessity to draft her old or unsuitable classes, is in danger of making the same mistake France, England, Italy and Belgium made. Because of lack of organization America is at present inferior to these nations in so far as her army motor car service is concerned.

Classes of Drivers

European government officials, whose only experience of motor cars has been to ride on the rear seat of a limousine, have decided that the work of driving a car is so easy that no young man should be allowed to perform it, no matter what his previous experience. In France the practice has been to ignore peace time training and accept for the motor transport service only men who have been wounded and are unfit for further service in the trenches or men of not less than thirty-eight years of age. The young men, if they are under thirty years of age, generally can be made into good drivers if subjected to a systematic course of training extending over three or four months. The older men, being mostly farm laborers, have not the faintest notion of the anatomy of a motor car and, not being very receptive, are difficult to train. The most unsuitable pupils of all, however, are the clerical classes of more than forty years of age, men who have had no road experience of any kind and are ignorant of the elements of mechanics. The farm laborer has driven a horse and can judge distances and understands in a vague sort of way the extra effort required to mount a hill. The lawyer or lawyer's clerk does not possess this intuition.

When the call was urgent, the French army put drivers into the field after only two weeks' experience with motor cars. The immediate result was deplorable, and although these men under properly trained officers eventually became good drivers, they destroyed thousands of dollars worth of machinery in the meantime. It certainly would have been more economical to the nation to have taken experienced men out of the actual fighting units and put them in the motor transport service rather than train raw recruits. After three years the desired result has been obtained and with the carefully elaborated machinery now in existence it is possible to put a farm hand into the school and after a time turn him out suitable for active service in the field.

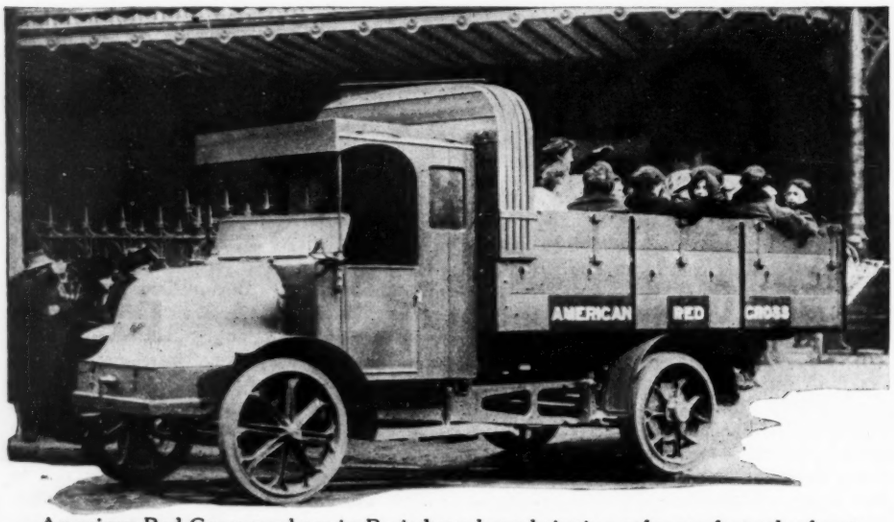
The notion that the only requirement of an army motor driver is the negative one of low physical ability is disastrous to the service. Another equally false notion is that any man having had a year's private experience as motor car driver is fit to go into military motor car service without further instruction. An infantryman entrusted with a rifle and a kit not worth much more than $100 is carefully trained in the use of those articles so as to get the most efficient service out of them. Men of every Allied army, including the American, have been entrusted with motor cars worth in each case from $1,000 to $4,000, without having received 5 min. in instruction as to the handling of those particular machines and without having been drilled in the highly specialized practice of maintaining motor cars in the field. The initial mistake has been made by highly-placed non-technical officials who possess the mad notion that motor car driving is an agreeable pastime. From the purely military standpoint it may be economy to weed all the hefty young fellows out of the motor car service, but viewed from the point of dollars and cents it is a huge mistake to suppose that the motor car service is a non-technical as well as a non-combatant branch.

Although American conditions are quite different from those of Europe, it is a mistake to suppose that we have nothing to learn from the motor car services of the British, French, Italian and Belgian armies. Such a big proportion of young American men have had driving experience that it is assumed every candidate who comes along is fit to go into the field with a car or convoy. This is untrue. The young American is first-class raw material and in a short time can be made into the finest motor car driver in the world. His good qualities are, at the outset, his most serious defects. He has plenty of dash and vim; he is determined to get there; and in his determination he quite overlooks the fact that cost is as important a factor in military as in civil life. Generally the young American driver has no sense of personal responsibility. If he smashes a car, or if he ruins one by his neglect, that is an accident of war and he expects to be given another machine without question. He has not heard that in all European armies it is a case for court martial, with probably a transfer to the front line trenches, where destructive methods can be applied to some advantage.

Value of Past Driving

Private car experience does not necessarily fit a man for military motor car service. Here are a few experiences. A big driveaway was organized from one of the Italian factories, the distance to be covered being about 900 miles. The first stage of that trip comprised the crossing of the Alps at a height of more than 7000 ft., there being a 20-mile climb on the Italian side and an equal descent on the French side. For this portion of the journey, by far the most difficult, professional testers used to convoy formation and well acquainted with the roads were engaged. The trip was made at an average speed of 30 m.p.h.; the time schedule was adhered to within the limits of less than 5 min. throughout the trip; there was not a scratch on any one of the cars; and although there were a few roadside stops the experience of the men was so great and the general arrangements so good that the entire convoy came through with much greater regularity than the train.

At the end of the first stage the professional testers were sent back and their place taken by young Americans, all of



American Red Cross workers in Paris have been bringing refugees from the front to points of safety. Here a truck is coming into Paris to one of the homes established for the homeless of France by the American Red Cross in the city

whom had had some experience as Ford ambulance drivers on the front, many of whom were college men and all of them of superior intelligence. They had relied on their nerve and had done very good work at the front, but all were devoid of military motor car training and all were very defective in mechanical knowledge.

The change was complete and instantaneous. The average speed dropped 40 per cent; there were always delays in getting away in the morning; there were frequent waits by the roadside for stragglers to come in; the driveaway was finished with 10 per cent of the radiators or fenders damaged; two clutches were ruined by inexperienced handling; one driver, until discovered by the officer, changed gears without withdrawing the clutch; he had had four years' driving experience—on a Ford. Another man did not know how to change a detachable wheel; he was discovered by the roadside trying to get the brake shoe off; 50 per cent of the windscrews were broken; men were held up with choked gasoline lines and did not know how to clear them; one car went into the ditch owing to reckless driving; another man asked for mechanical assistance to tighten up nuts which had worked loose.

Mishaps in Driveaway

A second and quite recent experience is very similar. Twenty-five new ambulances left the factory for a driveaway of 300 miles to the front. Seventeen gasoline tanks were punctured on the way; one car broke down completely owing to bad handling and had to be left by the roadside; three radiators were stoved in. The drivers were all young Americans who had plenty of individual experience on Fords but had never before been in convoy formation. Another army unit, supplied with first class European cars, had 40 per cent of their cars out of use after five months' service, while the town from which they operated bore traces of their labor in the number of lamp posts knocked down and civilians injured.

The various European armies experienced trouble in the early days by reason of collisions. In consequence elaborate bumpers were fitted both front and rear; no bumper is designed, however, which will give adequate protection against reckless or careless drivers. Most of the European forces have learned that the only remedy is in proper training and control of drivers, the role of the bumper being to provide against accidental collisions of a very light nature when maneuvering in yards and particularly against overhanging loads encountered when driving in the dark at night.

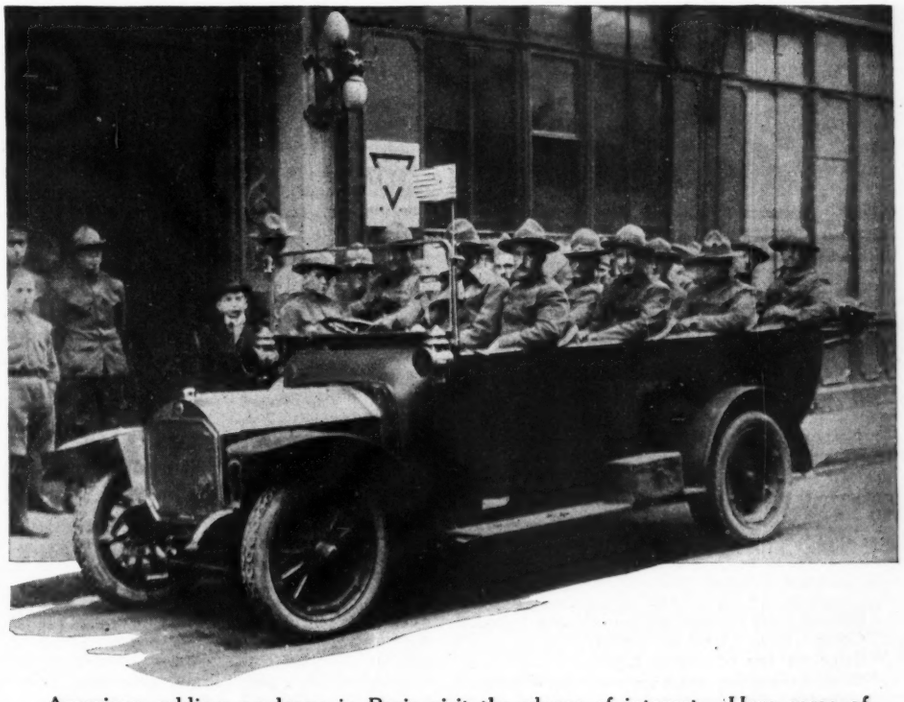
The only method of securing an efficient driving staff is to select only men who have had previous experience as drivers and to put them through a military course. A professional driver who has had ten years' experience on the road need not stay many days, but even he needs instruction in convoy driving, in the special rules to be observed on the road, in the loading and unloading of trucks, towing, first air to broken down vehicles, etc. The average young man who has owned or driven a car for a few months thinks he knows it all, and unthe same opinion. The fact that some American groups of untrained military drivers have not more than 60 per cent of their cars in service at any time, while veteran military-trained French groups do not have more than 5 per cent off the road, is proof of this. Individually the Frenchmen are no better, if indeed they are as good, as the Americans, but the former have had specialized training and the latter have had none.

More important than the training of drivers is the special technical instruction to officers. Both the British and the French maintain technical schools for the training of motor transport officers. The course covers motor car engineering, map reading, loading problems, practical repair work, fitting, etc. The cadets have to drive single cars and convoys under day and night conditions, the more experienced taking charge of the convoy. They are given instructions to reach a certain point, unknown in advance, and are expected to load up, take the necessary amount of fuel with an excess not to exceed 15 per cent and to reach the appointed place and unload within a limited time Such journeys have to be made under night conditions, without lights. In addition to this the officers have to be acquainted with an approved system of maintenance, so as to know how and where to requisition spare parts. This is not the simple matter it appears at first sight. In the first place it is necessary to know how to describe the part wanted; the officer must know what number he is entitled to keep in stock; he must know where every single part he receives is made use of, and he must know how many parts he has in stock.

An examination of numbers of requisition orders show that some officers do not have any clear notion of how to order parts. Among the most unforgivable requisitions were twelve fan belts, without indication of type of car; one roll of brake lining for Fiat cars, model not stated and fact evidently ignored that Fiat used nothing but cast iron liners; six magnetos, make and type not given; pair of gear wheels for gearbox.

Given a good officer and practically all the difficulties are removed, for even if the men are untrained or of limited experience not many weeks will elapse before he has transformed them into capable drivers. With an untechnical, inexperienced or unmethodical officer not only is the efficiency of the entire column lowered, but its operating cost will go up at an amazing rate. There is more scope for the display of technical knowledge, skill and intelligence in the motor car service of the army than in the infantry or the artillery. There is no branch of the service which can be made so costly to the nation if officers are not experienced and properly trained as the motor service. An inexperienced infantry officer will cause needless loss of life; an inefficient motor transport officer will be hardly less responsible for loss of life, and at the same time he will lose costly material.

It is not necessary that the motor car officer should be a highly trained engineer, but it is important that every officer entering any branch of the service in which motor vehicles are to be used should go through a special course of training before taking up his commission. There are thousands of men in America with good motor car experience, capable of running a garage, of carrying out repair work, etc., but the number is infinitely small of men who have had the special experience required successfully to operate trucks and cars on war service. The few weeks lost in imparting this necessary instruction to future officers will be more than repaid by the resulting economy and efficiency of the service.



American soldiers on leave in Paris visit the places of interest. Here some of them are leaving a Y. M. C. A. station for a sightseeing tour. This picture was taken during the long-distance bombing of Paris by the huge German gun

Truck Convoys to Run by Rules

Motor Transport Service Issues Regulations for Officers and Drivers in Army Trains

WASHINGTON, May 3—The motor convoy division of the Motor Transport service has issued rules for chauffeurs in convoy service and for the observance of the officers in command of the convoys driving overland from the Middle West to the new depot at Baltimore. The rules give the exact routes, methods of living, speed and care of convoys and attempt to so regulate the journeys as to maintain a minimum of trouble. Immediately following orders for a convoy trip the commanding officers receive the rules and prior to beginning the journey the chauffeurs are given the instructions governing their work.

Instructions for Chauffeurs

1—A truck, equipment and cargo is to be turned over to you, and you are to sign a receipt for it. Lost tools and equipment will be charged to you. Your assistant is under your direction and is to help you, but your responsibility cannot be passed over to him.

2—Before starting to drive, study carefully the instruction book. Read especially the rules for lubrication. On the Packard the oil in the crankcase is sufficient when it runs out of the overflow cock with the truck on the level. The crankcase is not full unless it runs over. Be sure the cock is closed after filling. All oil cups (see page 10, instruction book) must be filled daily. Oil in the crankcase of the standardized truck is tested by a rod on the left side of the engine.

3—Remember that driving a truck is very different from driving a touring car. A touring car at speed will practically keep itself in the road, a truck never will, and it is necessary to drive all the time. Constant watchfulness is essential.

4—Keep your spark advanced. The air control lever on the Packard is diverent from other makes of trucks and cars. It should be kept as far open (to the left) as possible. A too rich mixture does not give more power. If you get in trouble call the assistant truckmaster or mechanic. Never touch the magneto, carbureter or governor.

5—In going up a hill, decide at the bottom what gear will be necessary and change there. Never go as far as you can in high and try to change on the hill. You can't do it with a truck.

6—In going downhill, don't trust entirely to the brakes. You can easily burn them out, especially the foot brake. On long down grades shift into third, not second or first, and use the hand brake.

7—If you start to skid, don't lock the wheels. You may be on bare rubber, with no chain under you. Allow the wheels to turn slowly, using the brake gently. Always start and stop gradually.

8—All the trucks of a section must keep together. Never get nearer than 50 yd. to the truck ahead of you, nor more than 150 yd. ahead of the truck behind you. Someone on your truck must keep looking back. This runs independently, the last truck of a section not waiting for the truck behind it unless contrary orders are given by the company commander or truckmaster.

9—While every courtesy should be shown to other travelers on the road, remember that if a truck gets off the crown of the road with the right wheels on ice or in mud, it is stuck. A touring car can get off much farther than you can without getting into trouble. Keep on the hard road, and let the other fellow get off. Trucks should always be driven as near the right-hand side of the paved road as is consistent with safety.

Instructions for Officers

1—There will be delivered to you the trucks and equipment of a truck company for transportation and delivery to the Quartermaster, Motor Storage Depot, Camp Holabird, Colgate Creek (near Baltimore), Md. You are to deliver the trucks, equipment and cargo and are personally responsible for their being in good condition. You must be constantly on the watch for carelessness on the part of your men and for abuse of trucks, and will place a guard over the trucks whenever the drivers are not on them. The object is safe delivery of trucks not speed. Disciplinary measures will be taken against any officer who fails to take proper care of his trucks. A board of officers has been appointed at Camp Holabird to inspect all trucks received by convoy service, and company commanders will be held strictly accountable for any damage resulting from carelessness or violation of instructions.

2—Vehicles and cargo will be turned over by the shipping quartermaster on Waybill form 248. Any shortage will be noted on the back by consignee and disposed of by survey. For your protection you will have each chauffeur sign a receipt for his truck or car, and equipment, on special forms, if available, or on form 242. For cargo transported, each chauffeur will sign a memorandum receipt on form 242. Company commanders will be furnished with copy of form 249, Record of Property Transported, which he will have signed by the consignee.

3—The route to be followed is on the route card or maps herewith. It will be followed exactly as laid down. If this route is for any reason impassable or you have reasons for going otherwise, telegraph this office full particulars, but do not deviate from the regular route before receiving permission from this office. The principal towns passed through are shown on attached sheet. The towns designated as control points are shown on the same list. Inquiry will be made for telegrams at each control point. Gasoline will be ready at each control point. If tank trucks are not supplied, gasoline will be taken on at each control point; if gasoline trucks are supplied, at every other control point. Trucks should always be filled with gasoline and oil at end of daily run. The train should never start later than 7 a. m. if running by day or 7 p. m. if running by night. Unless bulky cargo prevents, all trucks will run with bows and covers on. Immediately on arrival in camp, chauffeurs should go over their trucks, fill with oil and grease and make necessary repairs and adjustments. Not only the truckmasters and mechanics but the officers must give personal attention to this. This can be done while the cooks are preparing the meal. Before leasing, trucks will be carefully inspected to see that they have all necessary oil and grease. The first day, trucks will be halted ½ hr. after starting, and all trucks again inspected by the company commander. Similar inspection will be made 1 hr. thereafter, and 1½ hr. after that. Special attention must be paid to lubrication of engines, transmission and rear axle. After the first day, the regular daily inspection should be sufficient, but no excuse will be accepted for damage to trucks due to lack of oil.

4—The trip will be made as nearly as possible under service conditions. Camp will be made outside of towns. Indoor sleeping quarters will not be used, nor meals accepted from the Red Cross or other organizations, except in case of great emergency. If such emergency arises, a report will be made by mail to this office.

Wire on Arrival

5—You will telegraph immediately on arrival in each camp to the Quartermaster General and to this office where you are and where you expect to go on the next day. Telegrams should be addressed: "Quartermaster General, Motors, Washington, D. C.," and (see Note A) be signed only with the surname of the company commander. State distinctly in the telegram the company letter: for example, Co. A or Co. C. Use Government forms whenever possible, otherwise use a commercial blank, as prescribed in Quartermaster Corps Manual 338. Never send official telegrams collect. Send day messages when they are no more expensive than night letters; the Government day message rate is for twenty words, including the address and signature. In addition to the daily report to the Quartermaster General and this office, similar reports should be made daily by telegraph to the commanding general of your own division and the commanding officer, Motor Storage Depot, Camp Holabird, Baltimore, Md. You will also telephone the Motor Storage Department, Camp Holabird, Baltimore, Md. (from ——— See Note B), giving the approximate time of your arrival, telephone number—Wolfe 3301, Station 7. From each control point, telegrams will be sent to this office and to the Quartermaster General, giving time of passing through and probable next camping place.

6—Method of purchasing supplies en route is as follows: Authorized subsistence stores, that is, fresh beef, vegetables and ice, will be bought and paid for by the company. If the price paid exceeds the current price (at ——— see Note C), receipted bills will be submittted to the Quartermaster (see Note C), who will reimburse for what is paid in excess over the price at (see Note C). Attention is called to the fact that this privilege covers only fresh beef, potatoes and authorized substitutes. There is also authorized the purchase of the following as necessary: Oil, gasoline, motor supplies, necessary machine shop work. For those purchases, each company commander will certify personally bills in triplicate, signing name, rank and organization, which will be mailed to this office, either by the seller or the company commander. No purchases other than the above are authorized, and

ON THE STANDARDIZED TRUCK THE FOLLOWING MUST BE OILED DAILY

Part	Number places	Amount	Lubricant
Grease cups on steering connecting tube..	2	2 turns	Grease
Grease cups on water pump.....	2	1 turn	Grease
Oiler on top of clutch housing.....	1	10-15 drops	Oil
Oiler in grease cups in rear axle brake shafts	8	1 turn	Grease
Clutch throw-out shaft.....	1	Few drops	Oil
Oil clutch pedals and linkage.....	.	.....	Oil
Clutch rear bearings.....	1	10-15 drops	Oil

any other purchases will be for cash; garage space for storage not authorized. If toll bridges are crossed, company commander will furnish either transportation request or certificate in accordance with paragraph 3685, M. Q. M. C. In addition to the above, each company commander will keep a list of all purchases made by him and at the completion of trip will mail to this office.

7—In case of breakdown of a truck, if repair parts are needed you are authorized to use necessary parts from equipment A that you are carrying as cargo or any other extra parts you are carrying for the purpose. A list of all such parts used, also of any parts or repairs purchased enroute, will be kept and turned in to the commanding officer, Motor Storage Depot, Camp Holabird, on arrival, and a copy furnished this office. Any broken parts replaced will be carried to Baltimore and turned in there. In case the necessary parts are not on hand, obtain same from the nearest agency. If unable to do this, inform this office by wire, stating what parts are necessary. When practicable, tow the truck to the nearest town; if impracticable leave it by the road. In any case, leave the chauffeur with the truck, impressing upon him the fact that he is still responsible for the truck, tools and equipment and cargo, if any, and instruct him—when repairs are completed—to report to the commanding officer of the first truck company coming through, but not to proceed alone, unless it is possible for him to catch up with his own company within two days.

8—At all railroad crossings the first truck of the company or of each section, as the company commander may direct, will drop off a man, who will remain there and signal whether or not the crossing is safe, until all the trucks, company or section are across. Not more than one truck shall be allowed at one time on any bridge, except those with several spans—when not more than one truck shall be on a span. It is the duty of the assistant truck master to look out for this.

Stock Equipment

9—If commercial trucks are supplied the following material will be supplied by this office on memorandum receipt:

For each truck—1 towing cable, 1 oil can, 1 screwdriver, 1 shovel, 1 monkeywrench, 1 spark plug wrench, 1 bucket, G. I., 1 pliers, pair.

For each company—3 complete tool rolls, for mechanics, 3 jacks, 1 block and tackle, 3 funnels, 3 oil measures.

Any articles lost or rendered unserviceable will be surveyed by you on completion of trip, and approved report of survey and remainder of articles will be returned to this office. The regular tool kit will be in a box, which is not to be opened. If standardized trucks are supplied, the regular tool kit and equipment which is on the truck is to be used enroute. If anything is lost or damaged it must be surveyed by you and approved report of survey delivered to the Quartermaster, Motor Storage Depot, Baltimore, or other destination.

10—Under no circumstances will the governors on the trucks be tampered with. Company commanders will be held responsible for the enforcement of this order. All drivers of your trucks are to use extreme caution in descending hills and to proceed down all hills slowly. Several bad accidents have already occurred due to carelessness in this matter.

11—Company commanders must be familiar with "Regulations for Motor Truck Transportation," which is a compilation of truck company technique gained through a great deal of hard experience. Company commanders will see that their men study the instructions herewith and the truck instruction book and will quiz them in regard to their knowledge.

12—As explained in the instructions to chauffeurs, it has been found best to run sections independently. No harm is done if they are several miles apart. It is the duty of the company commander and the truckmaster to keep in touch with all sections, and to see that they do not get too far apart. In general, the place for the company commander is at the rear of his train, where he can go forward at once in case of stoppage, but at the end of the day's run one officer should be at the stopping place to see that the trucks are parked properly, etc.

13—The cook truck should be attached to the first section, so as to get an early start on supper. If tank trucks are supplied, one should run about in the middle of the train, and one last. If there is only one gasoline truck, it should go last. The truck with spare parts, etc., should go next to last. If snow is encountered, it is recommended that ten or more men with shovels be carried in the first truck. It is much easier to dig through a drift before a truck gets stuck in it than afterwards, and a truck cannot buck its way through deep snow.

14—Too much emphasis cannot be laid on the importance of impressing the assistant truckmasters with their entire responsibility for their sections. It is on them that the efficiency of the company stands or falls. Mechanics should be appointed in every company. Even if they are not especially skillful, they can relieve the assistant truckmasters of watching lubrications, and keeping the sparks advanced and (on the Packard) keeping the air adjustment levers open. The almost universal habit of chauffeurs is to use too rich a mixture. It is recommended that a mechanic be assigned to each section.

15—Upon arrival at Camp Holabird, Baltimore, Md., commanding officers of convoy to report in person to commanding officer, Mechanical Repair Shop, Unit No. 306.

16—On completion of trip reports and suggestions will be made to this office. Accurate data will be kept as to cost of trip, and reports submitted to this office in triplicate on forms 416 and 417. For this purpose, records will be kept as described in "Regulations from Motor Truck Transportation," Records of Operation and Maintenance, pages 7 to 9. Drivers' daily report, model "B," and cost record, model "C," will be kept for every vehicle, including trucks, passenger cars and ambulances. If standardized trucks are supplied, there will be made direct to the Quartermaster General, Motors Division, an additional report on a special form provided, also a report by letter explaining in detail what, if any, trouble was experienced with the trucks, mentioning specifically each of the following points: Engine and ignition, cooling system, lubricating system, clutch, transmission, rear axle, front axle, brakes, springs, wheels and bearings, steering.

NOTE A

Chicago District—"Truck Convoy Service," Chicago.
Detroit District—"Truck Convoy Service," Detroit.
Buffalo District—"Truck Convoy Service," Buffalo, N. Y.

NOTE B

Chicago District—Frederick, Md.
Detroit District—Westminster, Md.
Buffalo District—Belair, Md.

NOTE C

Chicago District—Fort Sheridan.
Detroit District—Fort Wayne.
Buffalo District—Fort Porter.

Holt Caterpillars for Pershing

Secrecy Surrounds Making

PEORIA, Ill., May 3—The caterpillars constructed by the Holt company are not armored, but the engine transmission and other important parts are given ample protection. If it is desired to add the tank, this is done abroad. The caterpillars constructed for the British government were all armored after arrival in England, while those for France were given the addition after arrival in that country. The French order has been filled. The entire capacity of the plant is being devoted to orders from the United States and British governments. The larger type produced by Holt have 120 hp. and six cylinders. The 75, 55 and 45 are all four-cylinder.

Under instructions from General Pershing, the machines manufactured for the United States omit the guiding wheel. Originally this wheel was installed to prevent the big machines from stubbing in crossing ditches or other low places. It was found, however, that this wheel was prone to snap off and put the machine out of business. It was demonstrated that the front wheel was superfluous, as the guiding can be done by the side wheels. The new caterpillars and war tractors, however, all have the weight resting equally upon the side wheels and the change in type of construction will, it is believed, give much greater efficiency than those now in operation. The first of the new style will be turned out soon, the change being made without radical readjustment of the old models. Other slight changes from the original construction have been made upon the suggestion of General Pershing, following his observations abroad. He also has recommended that the tractors for hauling American artillery and army supply vehicles being constructed at the Holt plant be restricted largely to the 55 and 45-hp. The smaller type has been found most satisfactory.

Great secrecy is maintained in the construction of the war tractors. A high iron fence surrounds the entire plant and visitors are not welcomed. Watchman are on guard at every gate, and it is difficult for anyone not engaged on business to obtain admittance. To fill the orders of the Allied nations enormous buildings have been added and many thousand men are employed. Solid trainloads of the completed tanks and tractors are being shipped abroad, but the orders yet to be filled will keep the plant working at capacity many months to come.

NEW 1-TON COMMERCE TRUCK

Detroit, May 3—The Commerce Motor Car Co. is entering the market with a 1-ton truck. The chassis will sell for $1,340 and is equipped with Bijur starting and lighting and Dixie magneto ignition with generator and magneto driven in tandem. There is a choice of three types of bodies: Open express, to sell at $1,375; open express with top, $1,450; stake body, $1,490.

Maintenance vs. Building Roads

Former of More Real Importance Than Latter—Some States Heed Need

MAINTENANCE of highways is more important than the building of them. Only when this country learns that its impression that roads once built need no further attention is erroneous will our road system begin to become efficient. For years men have been and today they are maintaining their farms, houses, barns and fences; even the shoes which they wear daily are half-soled and heeled at regular intervals. If a shingle becomes detached from the roof of a building by the action of the elements the owner does not wait for the water to percolate through and destroy the papering and plastering; he immediately repairs the roof. This same argument applies to roads as much as to any tool used by man and more especially should it apply to highways because they not only are subjected to various kinds of traffic but are also at the mercy of the elements.

Traffic has changed so materially in the last few years that the present situation finds no parallel. Labor conditions have changed considerably as well as the cost of materials entering into road construction, consequently roads today cost more than those built ten years ago. Each road has its life so that at the end of a period of years, if no attention is given, the road will have to be reconstructed and the chances are that it will cost more than the original construction as everything is increasing in price, whereas, if the various counties would immediately repair any breaks in the surface, keep the ditches open and the weeds cut, the life of the road would be increased several hundred per cent and at a cost that would be small compared with the expense of reconstruction.

Original vs. Ultimate Cost

As a concrete example, let us assume that a macadam road costs $3,000 a mile and that its life without attention is three years. This makes the road, during its life, cost $1,000 a mile. Under a patrol system, the expense of which would not be much in excess of $100 a mile for the three years, the life of the road could be doubled, possibly trebled, the average cost if doubled being $600 a mile and, if trebled, $433 a mile. Need more be said of the advantages of road patrol as a saving to the nation, state, county and incidentally to the tax payer?

Building roads is a business proposition; maintaining them is a part of the business, without which the business itself fails. The taxpayer should interest himself in this saving represented by proper road patrol. After all, roads and business are synonymous, whether they be highways, railroad, or waterways. Many systems of maintenance have been tried but the most effective has been the patrol system where a man is given a certain stated number of miles to watch over each day

Plea for Upkeep

or week. This is the system so generally found in England that one does not wonder why British highways excel. In the British Isles practically all of the roads are built of Scotch granite. This easily bonds and makes a road that is quite similar to our new macadam when well bonded with tar or other paving material. Each patrolman has six miles to maintain. At frequent intervals along the road are piles of repair material from which the patrolman can get material with which to fill small ruts and holes. After every rain he is required to go over his beat and as often as once every three days whether it rains or not.

The road patrolman should be equipped with the necessary carts, drags, tools, etc., with which to make needed repairs and he should be thoroughly acquainted with every feature of the road and know where to expect trouble after heavy rains. He should keep the holes and ruts repaired and the ditches open. The writer recalls a statement frequently made by Peter Lee Atherton, president of the Jackson highway and a prominent good roads man in Louisville, Ky. Mr. Atherton says: "There are three factors to road building—the first is drainage, the second is drainage and the third is drainage."

Culverts must be kept clean and the weeds should be cut. Under average conditions one man perhaps can care for ten miles of road. Railroad companies long ago realized that it is absolutely necessary to maintain their lines. The government has appreciated the necessity of having streams locked and dammed and keepers appointed, dredge boats provided to keep the channels clear of obstacles dangerous to navigation and yet the road, which is one of the greatest of all systems of transportation has received very little attention at the hands of the general public.

The two systems—rivers and railroads—for years have been under the control of experts. The roads are the only system of transportation in the world owned and controlled by the people themselves, and it is the only system of transportation that is not properly run, so it behooves every citizen to turn his attention to the maintenance of a highway once it is built to see that there is centralized authority over the control of roads in every county and to co-operate with the county officials in every way possible. The highways represent an investment of community wealth, which if not safeguarded through adequate maintenance, will represent a liability instead of an asset.

Think how much more necessary it is that we have men to patrol our highways and keep them in repair than it is that a railroad have a section gang. The railroad is composed of steel rails on ties which carry the heavy trains and locomotives. The highway carries much heavy traffic which must move along, not on smooth rails, but upon the ground. If it is advantageous to give a good finish to the surface of the new highway it certainly is worth keeping in that condition when it requires so little effort that one man can take care of ten miles of it a year.

Some of the states are awaking to the necessity for road patrol. Indiana, for example, has long stretches of good macadam road. Why? The answer is easy to the tourist who happens to pass over the good macadam roads and learns that they are several years old. At intervals of 100 yards, perhaps, there are small piles of material by the roadside that resemble enlarged ant hills. This is the material which the patrolman uses to keep the road in repair. In nearly every instance where such a system of maintenance or patrol is found, there are numerous signs which ask the tourist or motorist not to drive in the ruts. Thus if a rut or hole comes, the patrolman fills it and motorists are careful not to plow through the rut or hole and force out all the repair material before it has time to set.

This does not mean that Indiana maintains such a system of patrol state-wide. It has some of the aggravating kind of worn-out macadam that one finds at intervals in every state where macadam roads are built. The patrol system is essentially a county problem, but it should be the problem of every county in the whole United States, and fortunately, it is a problem that is easy of solution.

How New York Does It

Let us look for a moment on the system of patrol and maintenance employed in New York state. The state is divided into nine divisions; at the head of each division is a division engineer, who is assigned by the commissioner and whose duties relate both to construction and maintenance within the division. Each division comprises about six counties and each county has an assistant engineer who works under the direction of the division engineer whose office is centrally located and who has a staff of clerical, mechanical, inspection and engineering employees. Each county engineer has one or two regular inspectors whose duties pertain only to maintenance and include the supervision of the work performed directly by the department.

The mileage assigned to each inspector is approximately 100 miles. The inspector has a working patrolman with horse and cart for each four to six miles of highway, whose duties are strictly maintenance and minor repairs. At times the patrolman may be given one or more helpers and a small gang and again a gang may be installed with a foreman to perform a larger

task than would be practicable to assign to a patrolman.

Of the departmental forces, New York has two general schemes—the patrol system and the repair gang. The patrol system is used to perform the constant minor repairs to the surface, shoulders and drainage system on the gravel and macadam types of improvement. The patrolman furnishes a horse and one-yard cart, small hand tools and is required to work eight hours daily, except Sundays and holidays, during eight months of the year. His pay is $3.25 a day, payable monthly. During the winter months the roads are not patrolled. The standard length of the road patrolled is approximately 5 miles and the man employed is expected to live on or in the vicinity of his work.

The repair gang is used either to cover roads not patrolled, to supplement the patrolman, to expedite work or to perform work of greater extent than the unassisted patrolman can handle advantageously, and generally to perform work that by its nature cannot readily be expressed in precise terms as contract items. Such labor and teams are employed when needed and are paid the prevailing rate, their time being carried on a monthly payroll. Both the gangs and the patrolmen are supervised by the county assistant engineer and inspector, executing the directions of the division engineer.

OHIO WANTS ITS ROADS

Columbus, Ohio, May 3—The Ohio Macadam Association, working in conjunction with the Ohio Goods Roads Federation, the Ohio Utilities Commission and the Ohio Highway Commission, has started a state-wide campaign to prevail upon Federal officials the necessity of completing the road program in Ohio despite war condition. A special committee will call on Director-General McAdoo for transportation facilities for the building of new roads and the maintenance of existing improved roads. The committee probably will be headed by Governor Cox. The Ohio Good Roads Federation will be represented by President D. S. Humphrey and Senator W. A. Alsdorf, secretary. A. P. Sandles, secretary of the Ohio Macadam Association, will represent that organization, while James B. Dugan, chief inspector of the Ohio Utilities Commission, will be on the committee. Albert H. Hinkle, assistant in the maintenance department of the Ohio Highway Commissioner, also will be on the committee.

A conference was held at the office of the Ohio Macadam Association late in April to outline the steps to be taken. It is urged that since all of the financing has been done and there is approximately $3,500,000 available for road improvement and repair the program as outlined some time ago should be carried out. The money is collected in the form of taxes or in process of collection and thus it will not interfere with the Liberty Loan campaigns or the sale of thrift stamps.

It is figured that it will require approximately 102,000 open-top cars to move the material for the carrying out of the program. It is estimated by the engineering department of the Ohio Highway Commission that the weight of the materials will be 4,069,000 tons.

Another phase of the question taken up by the Ohio Macadam Association is the maintenance of the present improved roads. It is pointed out that the heavy truck traffic is grinding the roads into dust.

A Tourist's Observations in "Dry" Territory

WEST VIRGINIA has been "dry" since July, 1915, prior to which time the motorist or other traveler, say from the direction of Pittsburgh, having passed through a "local option" district of southwestern Pennsylvania, such as the vicinity of West Alexander has been for years, could quench his thirst at a certain hotel just across the West Virginia line. Naturally the place came to be quite widely known as the "Golden Gate," though its former brand of hospitality is now a thing of the past.

A photograph of the old stone tavern at Roney's Point, on the way from the site of the "Golden Gate" to Wheeling, taken about three years ago to illustrate an historic narrative showed, even more plainly than was desired, a sign indicating the presence of liquid refreshments. But things have now changed, and the sign has disappeared, along with thousands of others throughout the State.

Just west of the stone bridge at Elm Grove, about 4 miles east of Wheeling, is another old tavern, still kept as a public house; when the State went prohibition, it was said that was the first time in over eighty years that liquid refreshment could not be obtained there.

One still finds in that state and adjacent territory a card, made closely to resemble the regular posted forecasts of the weather bureau, reading:

FORECAST FOR WEST VIRGINIA
After July 1, 1915, Long Dry Spell

It is said that at Westernport, Md., just across the Potomac River from Piedmont, W. Va., and therefore since July 1, 1915, a rather "wet" place, that in the early fall a motorist came over the iron bridge from Piedmont, stopped in front of a place of liquid refreshment at Westernport, walked in and without saying a word made a sign with both hands, held for a moment about as far apart as the height of a glass of beer. The one in charge of the place took the hint, and served the stranger, who drank with evident satisfaction, afterwards clearing his throat and asking boldly for another.

After eyeing the visitor carefully for a minute, the server asked: "Why in thunder didn't you speak out for the first one? I thought you were deaf and dumb!"

"Nothing like that," was the reply, "I have just finished a tour of West Virginia, and when I struck this place, I was too dry to ask for the first one."

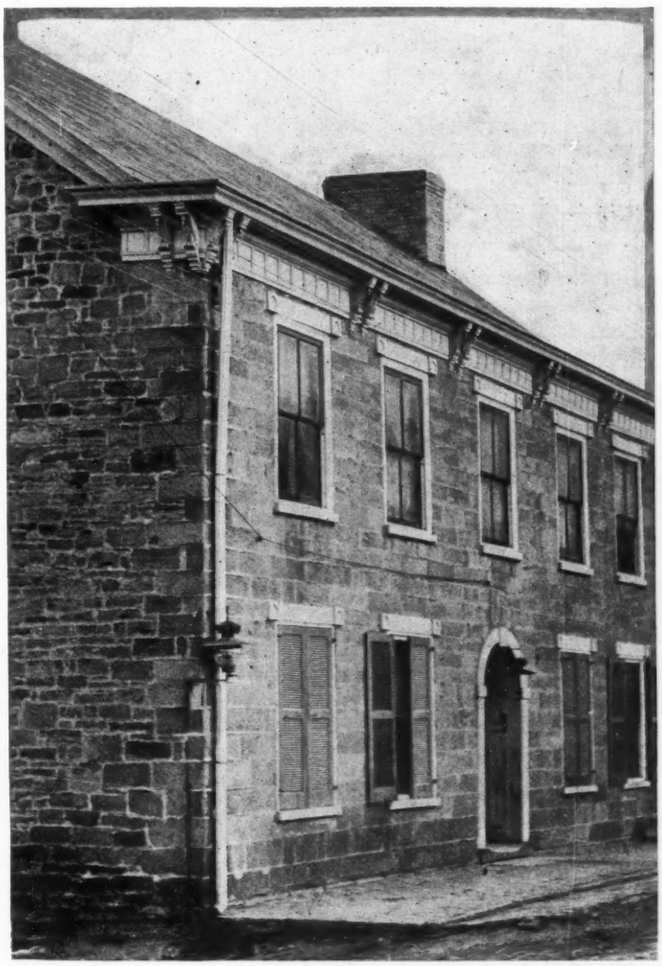
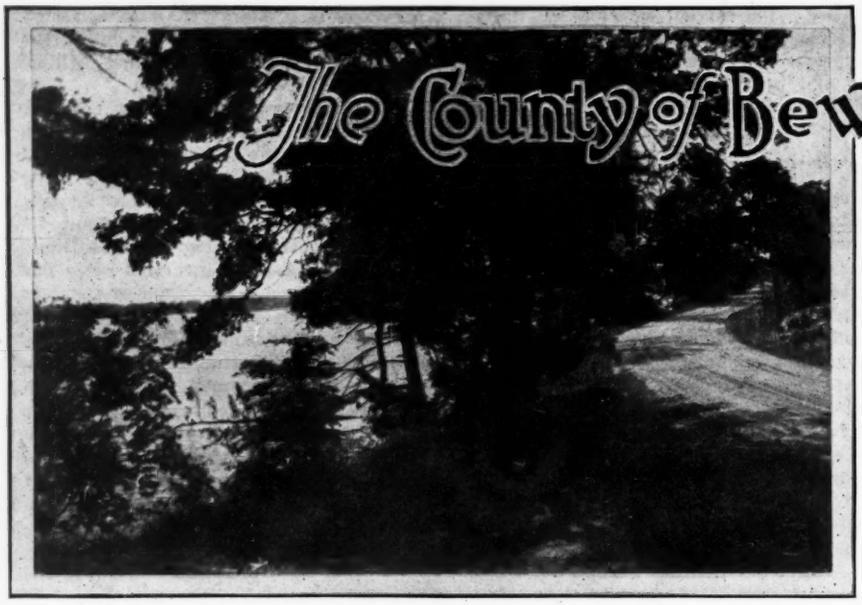


Photo copyrighted by J. K. Lacock

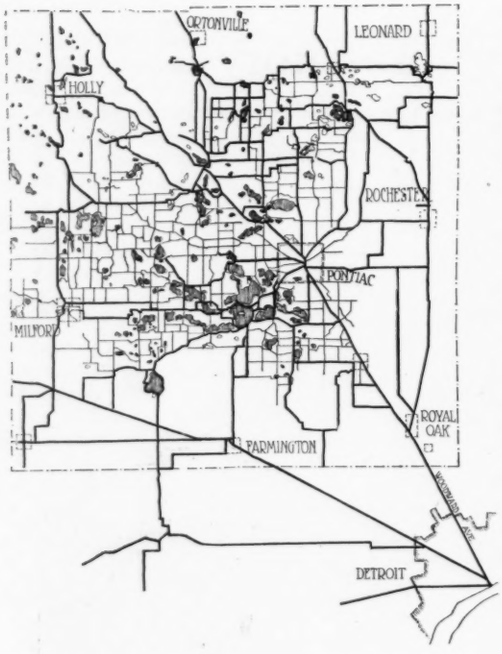
Old stone hotel at Roney's Point on the National Road in the "Panhandle" of West Virginia. Some of the former beer signs remain, but they are meaningless



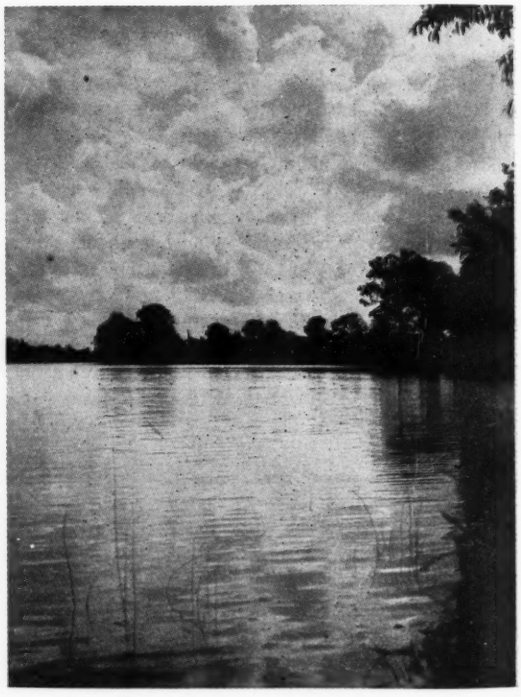
The County of Bewildering Lakes

by Allen Sinsheimer

In the county of bewildering lakes the roads wind around and up and down the hills between countless lakes of shining surface and bordered edges. Each lake has its beauties. All have scenic value



A glance at the map given here shows you the close proximity in which the many lakes of Oakland County, Michigan, dwell. Given the good roads of this section, is it any wonder that a trip through this section is one looked forward to by motorists of the immediate region as well as by motorists who pass by



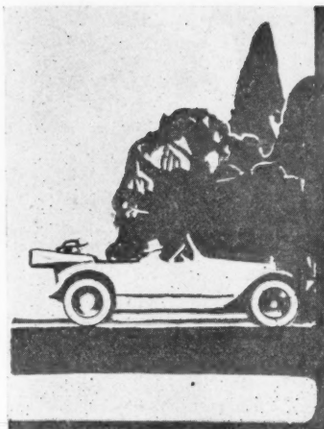
Though very wonderful, this picture is not so rare as one might on first thought think. In a county of so many lakes the same conditions are apt to be reproduced to a greater or less degree, though the motorist usually finds each lake has some particular point of interest

CUT beyond Detroit, and to the northwest, where the Ford plant marks the culmination of the city's many, mighty factories, lies the road to the gateway of Bloomfield hills and Oakland county—where every farm includes a lake and the bewildered tourist finds lakes on every side.

The county, located in Southeast Michigan, includes 900 square miles of fertile soil, 450 glistening lakes, 2600 ponds, spacious estates, and numerous winding rolling hills. There is a lake to each 2 square miles. Ponds are everywhere. Estates, cultivated and tilled, are completed with quaint and unusual homes. It is a land of beauty where the wealthy manufacturers of the motor car city have devoted time and money to the development of the magnificent natural splendor and have created a residential district combining the convenience of the city and the bloom and tranquillity of nature. Thirty minutes suffices to carry one from the heart of the city to the hills, and it is a short jaunt that all motorists visiting Detroit should include in their itinerary.

Motorists find interest other than the vast estates. The land was formerly the home of the Hurons and Pottowatamies, who lived and hunted and warred in its hills. Pontiac, now a thriving motor car and parts manufacturing city, founded in 1818, was named after the famous Indian chief Pontiac, who disputed the right of way to Rogers, the first white explorer in the state. The many lakes contain peculiar interest. Walled lake is so called because of a singular wall formation extending for a rod on each side of the shores. The wall is 4 ft. high and 5 ft. thick and has aroused much curiosity as to its origin, some authorities claiming it to be a man-made structure, while others believe it an effect of the glacier period. Orchard lake, so called because of an island orchard in its center, was known to the Indians as the Me-nah-sa-gor-ning—the place of the orchard.

The roads are fair. A smooth macadam road extends from Detroit to the hills, and gravel roads wind in about the estates and the many lakes, frequently separating one lake from another, and carry motorists to every corner of the county. Tourists will find it particularly enjoyable if they make the journey a week-end one, leaving Detroit and circling through Bloomfield hills, Orchard lake, Pine lake and Cass lake to Pontiac to Lake Angelus, Loon lake to Long lake to Walled lake and returning to Detroit. Many summer resort hotels afford opportunity for night stops.

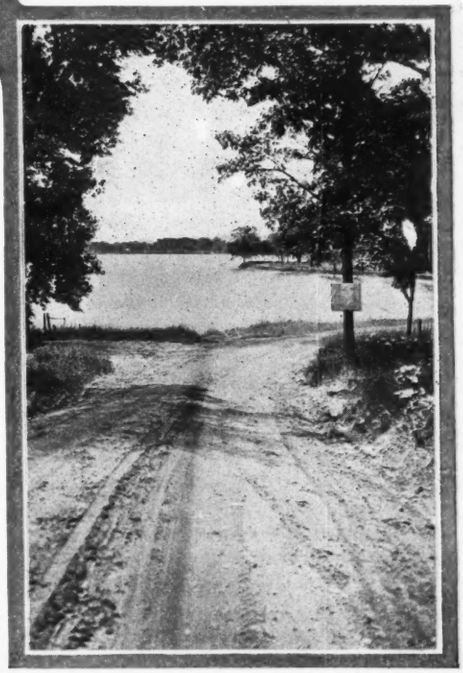


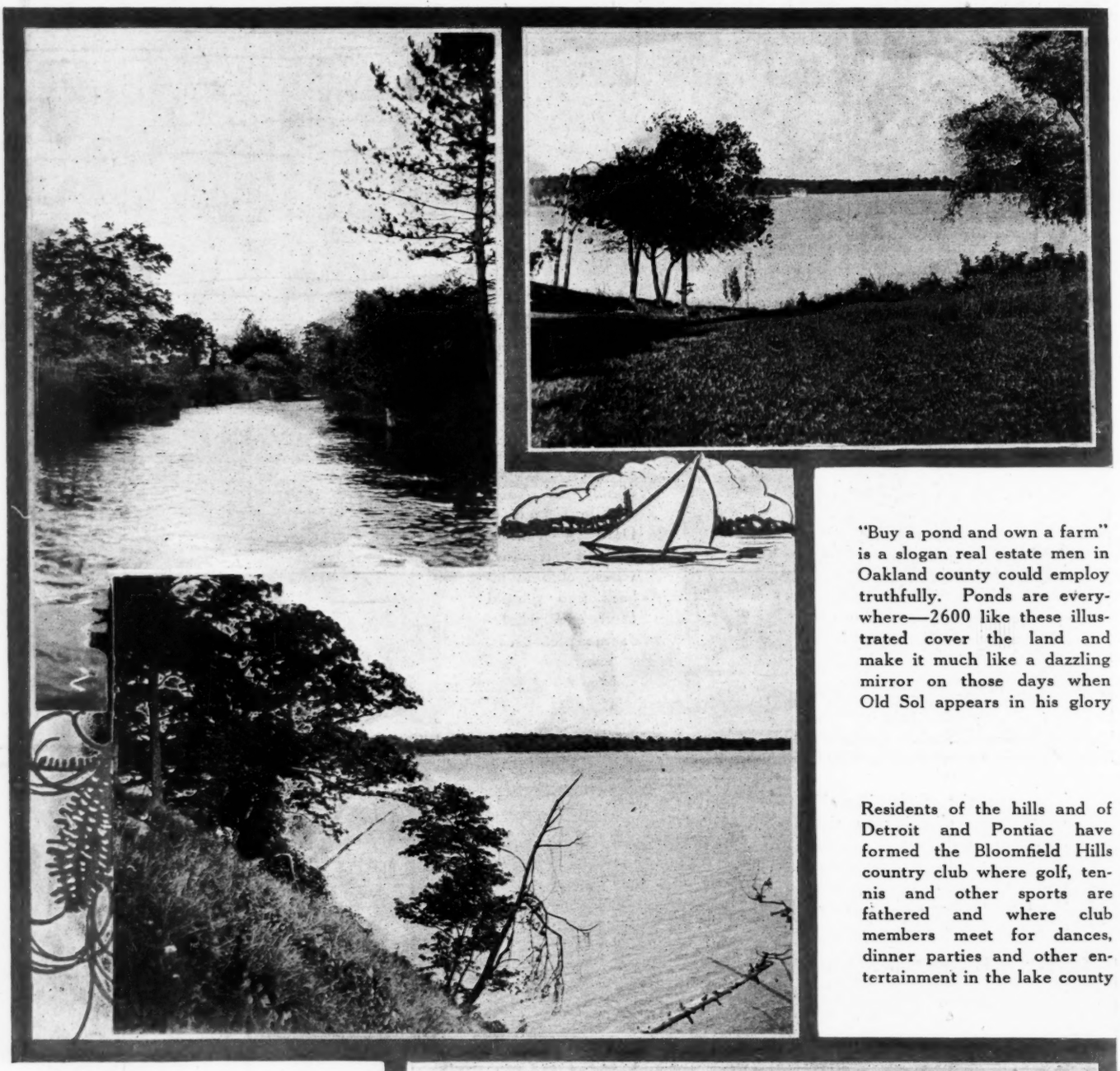
On the very edge of Pine Lake stands the Automobile Club of Detroit — a magnificent structure where club members find good food and wholesome pleasures

The motorist finds himself coasting or climbing in the Bloomfield hills. It is a land of rolling, sloping, winding roads, varying from macadam to wagon trails—and on every side are lakes and orchards

The climate of Oakland county is considerably milder than that of Des Moines, Iowa, 200 miles farther south, and the many farms and orchards testify to the fertility and richness of the soil here

If the view is not one of farms or orchards or lakes or estates one thinks of Indians, bears and wilderness — for many heavy-shaded natural forests remain. In fact, the tourist is quite likely to meet hunters on the road. Hunting, in season, is both profitable and exciting. Many of the natives earn their livelihood by dealing in the skins

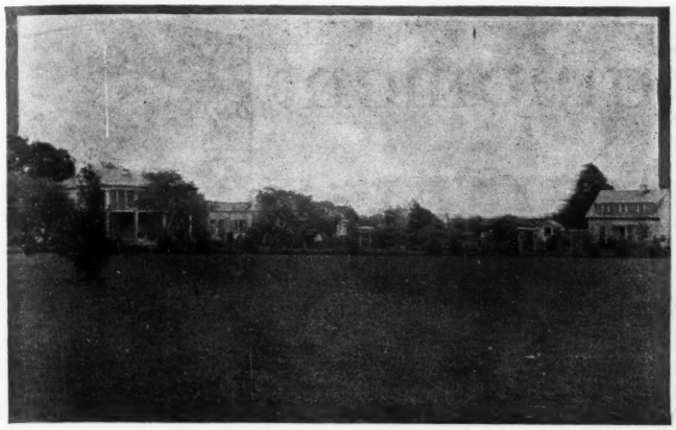


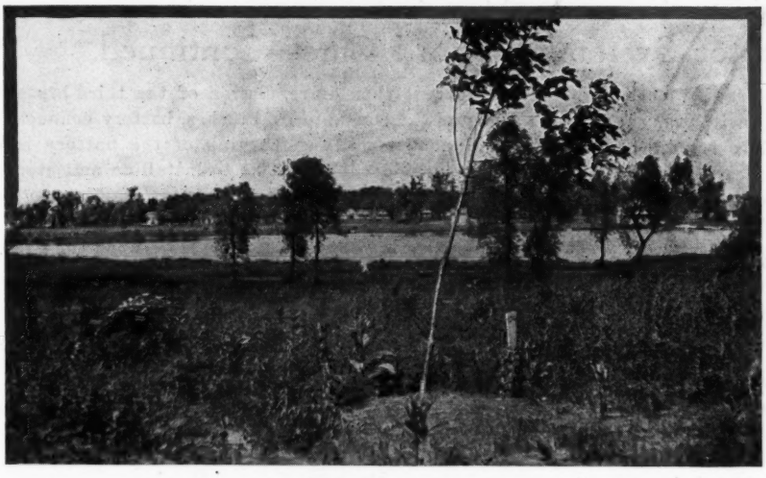


"Buy a pond and own a farm" is a slogan real estate men in Oakland county could employ truthfully. Ponds are everywhere—2600 like these illustrated cover the land and make it much like a dazzling mirror on those days when Old Sol appears in his glory

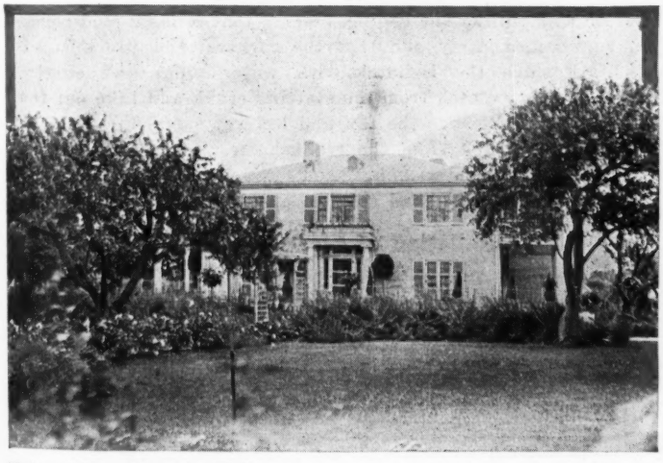
Residents of the hills and of Detroit and Pontiac have formed the Bloomfield Hills country club where golf, tennis and other sports are fathered and where club members meet for dances, dinner parties and other entertainment in the lake county

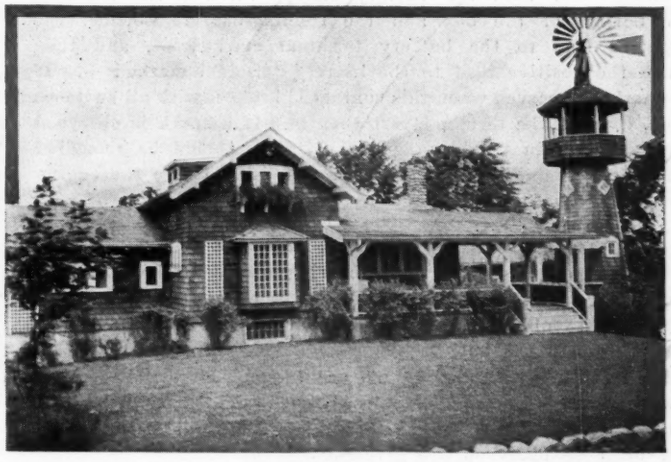
Lakes to the right, lakes to the left, lakes to the front, and lakes to the rear describes the innumerable lakes and ponds in Oakland County, Michigan. On some roads it is possible to view Orchard Lake, Cass Lake, Pine Lake and a hundred small ponds by slightly turning one's gaze. Summer homes in keeping with the beautiful surroundings add to the attractiveness of the scenery. And the tourist viewing the forests, estates, farms, orchards, ponds, lakes and summer homes may be justified in calling this county a land that is most beautiful





Estates are of all sizes and styles. No particular architecture prevails, and English hunting lodges and Dutch windmill effects can be found within hailing distance of each other. The estate shown at the upper left stands at the gateway to the hills both on the hill road and on the macadam road from Detroit. The hunting lodge in the upper right is located well into the hills and is situated with a small pond before it which is set off with white stone tables and benches of much contrast





Fewer Pennsylvania Tolls

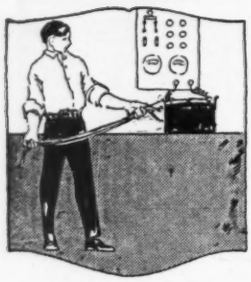
The antiquated system of toll roads in Pennsylvania has suffered another blow through the purchase of four of York County's important toll roads by the state and York county commissioners. Forty-five miles of road, including 22 miles on the Lincoln highway, were freed of toll in the transaction and the cost to the state and county amounted to $173,860. The day following the taking over of the roads by the state, the gates were torn down, and large printed cards posted on the toll houses by officials of the state highway department gave warning to motorists that "This road is free. Pay no toll."

On the four stretches of road, the Susquehanna and York and York and Gettysburg turnpikes, both on the Lincoln highway, and the York and Liverpool and York and Maryland Line turnpikes, on the state road leading from Harrisburg to Baltimore, thousands of dollars were collected annually by the road owners in toll from motorists and the traveling public in general. The first two sections of roadway extend from the Susquehanna River bridge, between Columbia and Wrightsville, to the southern boundary limits of York County. The bridge is owned by the Pennsylvania Railroad and toll is charged for all vehicles and pedestrians passing over the bridge. With the elimination of tolls on the Lincoln highway in York county, only a few stretches of road on the coast-to-coast highway remain where motorists are required to pay toll. Proceedings are now in progress in Adams and Lancaster counties for the taking over of sections of the Lincoln highway by the state and the elimination of toll in these two counties. The following are the several turnpikes in York county purchased by the state and the amount paid for each: Susquehanna and York, $60,000; York and Gettysburg, $73,560; York and Liverpool, $28,500; York and Maryland line, $11,800. The lengths of the several pikes are: Susquehanna and York, 10 miles; York and Gettysburg, 12 miles; York and Liverpool, 6 miles; York and Maryland line, 17 miles.

Detroit to Pontiac

Petitions for a new concrete highway from Pontiac, Mich., to Detroit have been filed with Oakland County and state officials. The route selected is Auburn avenue from Pontiac, entering Detroit on John R. street, just east of the Ford factory. It is a direct line to Utica and Mount Clemens and a much traveled way to Rochester. It is expected that this route will divert traffic from the present congestion of summer seasons on Woodward avenue concrete, which passes through Royal Oak and Birmingham. It is probable the work will not be started until next season.

In conjunction with the roads to be built this year around Orchard Lake and out of Maple avenue from Birmingham toward Farmington, several of the larger villages of the county thus will be connected with Detroit and Pontiac by improved thoroughfares.



Electrical Equipment of the Motor Car

By David Penn Moreton & Darwin S. Hatch.

Editor's Note—Herewith is presented the ninety-fourth installment of a weekly series of articles begun in MOTOR AGE, *issue of June 29, 1916, designed to give the motorist the knowledge necessary to enable him to care for and repair any and all of the electrical features of his car, no matter what make or model it may be. At the conclusion of this series, "Electrical Equipment of the Motor Car," with additions, will be published in book form by the U. P. C. Book Co., Inc., New York.*

Part XCIV—Genemotor System for Ford Cars—Continued

MOUNT the starting switch and cut-out on the under side of the floor board as in Fig. 514. Mount the lighting switch on the steering column as in Fig. 515. The battery box should be mounted on the right-hand running-board. The holes that must be drilled in the running-board and splash plate to accommodate the battery leads and mounting bolts for three different models are shown in Fig. 516.

The headlights and taillights may be wired up with the leads supplied, which are tagged to correspond to the diagram given in Fig. 517. Connect the electrical unit to the switch and cutout, as in Fig. 517, placing on each battery cable a piece of the circular loom supplied at the point where the cables pass through the slot cut in the splash plate. This circular loom should be held in place by friction tape at each end. Place the battery in the box with the wooden cleats beneath it, and clamp it to the running-board with the battery clamps through the holes in the bottom of the box and the running-board. Connect the negative lead to the battery terminal marked —, and then touch the positive lead to the battery terminal marked +. If no spark is observed when this contact is broken, with all switches open, connect the terminal permanently. If a spark is observed the system is in trouble and the difficulty should be remedied before a permanent connection is made. Make sure the engine turns freely before trying the starting motor.

Operation and Precautions

The grease cup in the front bearing should be kept full of grease and compressed two or three turns every 200 miles. The gear teeth should be greased about every 500 miles by inserting grease through the hole in the gear guard. The lamps recommended for use with the system are 12- and 14-volt, 15-candlepower Mazda or 24-candlepower nitrogen and 12- and 14-volt, 4-candlepower Mazda for the taillight. Additional precautions that must be observed are given under the heading Operating and Precautions for the chain-driven type.

Installing Ammeter

An ammeter is not supplied regularly with the system as the makers do not deem it necessary since the generator is provided with the inherent type of regulation of the third-brush type, so that as long as the commutator, brushes, battery connections, etc., are kept in good condition charging of the battery is assured. If the owner considers it advisable to install an ammeter to check the operation of the system, the instrument readily may be added by removing the jumper wire from the starting switch to the cutout and connecting the ammeter leads between these two points as in Fig. 518.

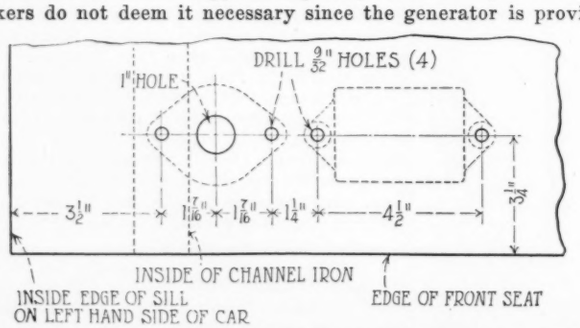


Fig. 514—Layout for holes used in mounting starting switch and cut-out on the under side of the heel board

Chain-Driven Genemotor

The chain-driven type of Genemotor for the Ford car as put out in 1917 was of the single-unit, two-wire, 12-volt type. The unit is mounted on the left-hand side of the engine on a special bracket attached to the engine base and driven by a silent chain. The generator output is regulated by the third-brush method.

Preparation of Engine

Before dismantling the engine, be sure that it is in good condition, running smoothly and that the carbureter is properly adjusted. Remove the radiator with water pipes and elbows. Remove the claw clutch from the starting crank and take out the starting crank. Remove the fan and bracket complete. Remove the fan drive pulley from the crankshaft. Remove the pinion rod from the carbureter and also the timer rod. Take out the second and third right-hand crankcase bolts at A in Fig. 519.

Installation of Electrical Unit

First clean the engine thoroughly to insure proper seating of the supporting bracket. Also remove any high spots or fins on

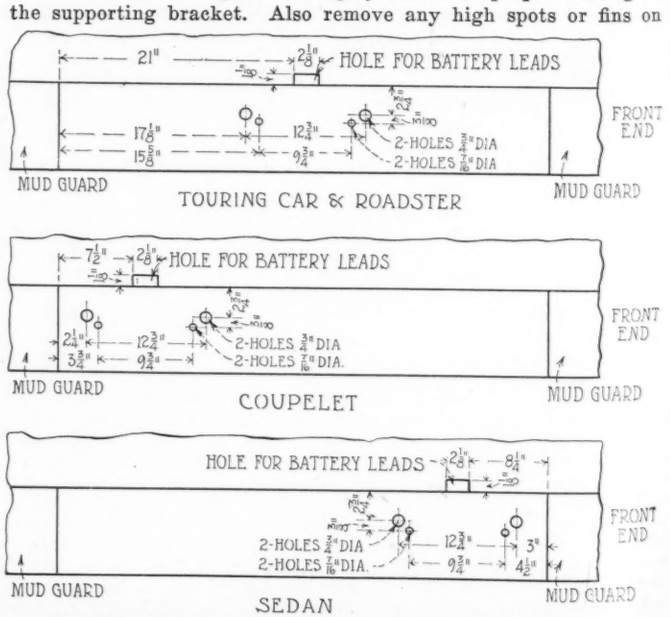
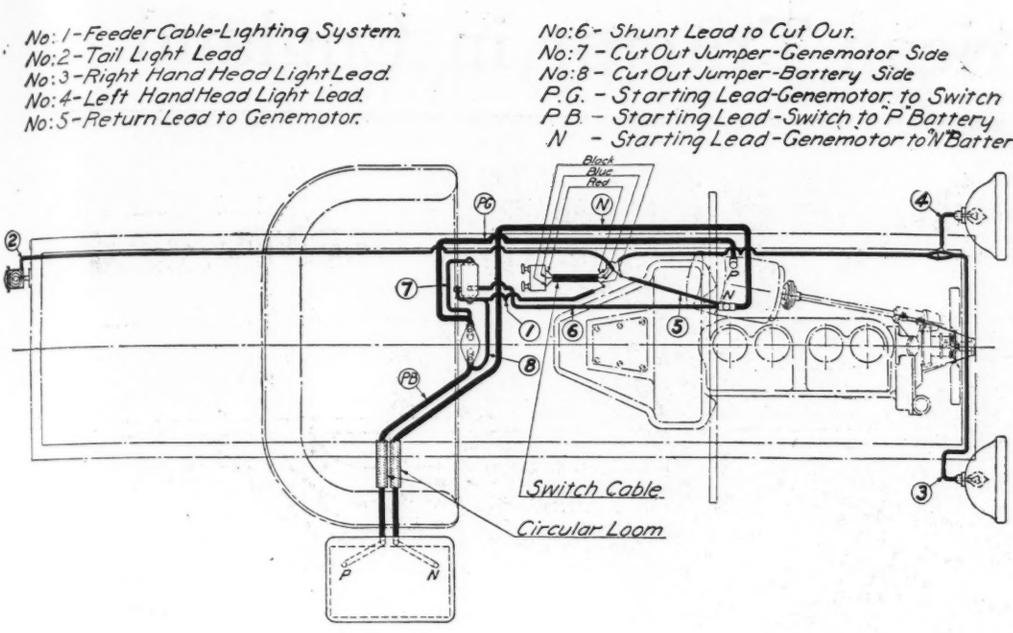


Fig. 516—Layout of right-hand runningboard for mounting battery box on the different models of the Ford car



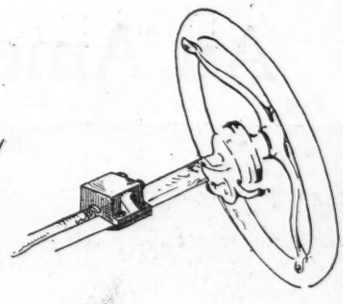


Fig. 515—Lighting switch mounted on the steering post

Fig. 517—Wiring diagram of improved chain-drive Genemotor

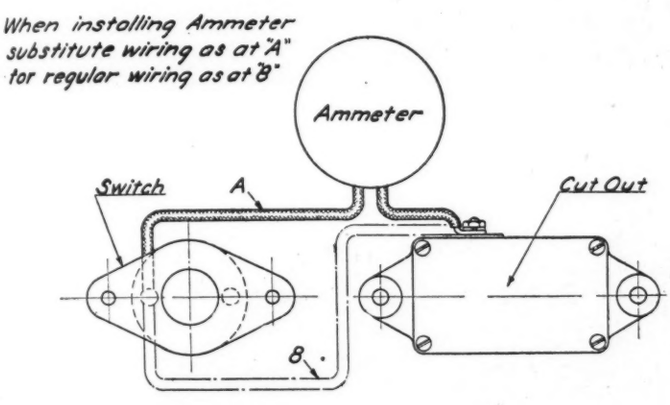


Fig. 518 — Wiring diagram showing connections of ammeter in the circuit

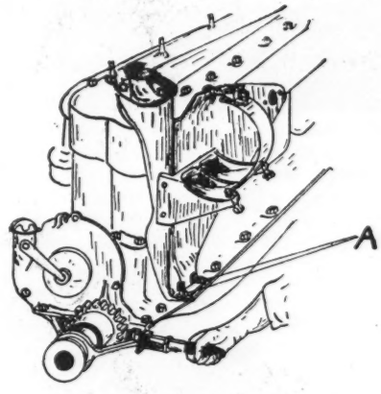


Fig. 520 — Bending nose pan to make room for driving chain and method of mounting supporting cradle

the castings that may in any way interfere. Mount the supporting bracket on the engine, inserting first the bolts through the base, then the water-flange bolts, with the elbows. Place the gaskets on each side of the bracket. Use the plain washers between the engine case and the foot of the supporting bracket as at D in Fig. 519 to insure proper support of the bracket and alignment of the holes with water-pipe connections E and F, and bolt the bracket in position temporarily. Chisel off part of the two rear rivet heads in the nose pan of the engine and bend out the edge of the nose as in Fig. 520, to provide clearance for the driving chain. There should be at least ⅛ inch clearance at all points around the sprocket after the chain is in place. Replace the starting crank and turn the engine over slowly to feed the chain on to the engine sprocket, and connect the ends of the chain together. Carefully observe the arrow on the side of the chain which indicates the direction in which it must travel.

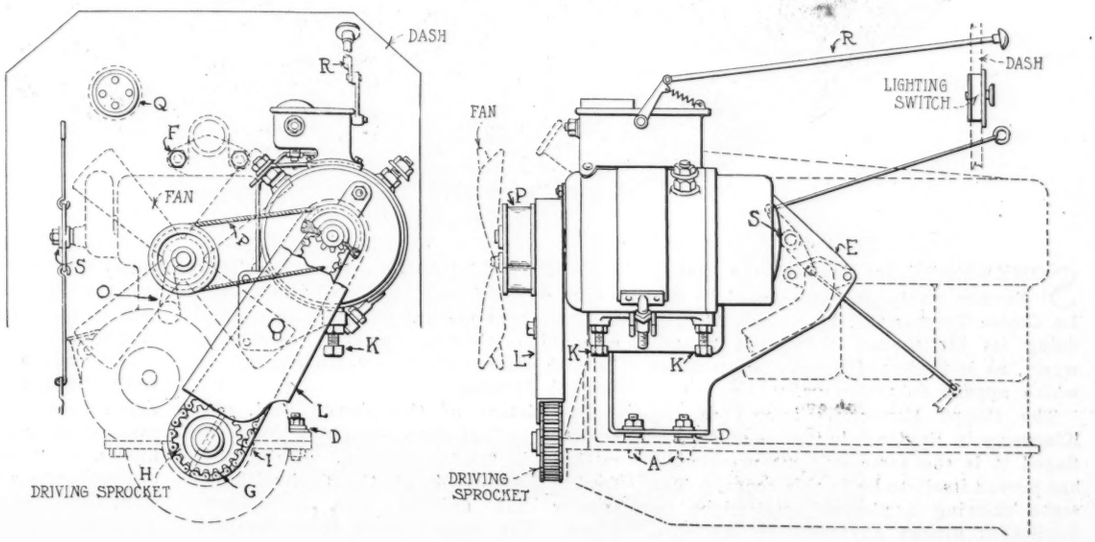
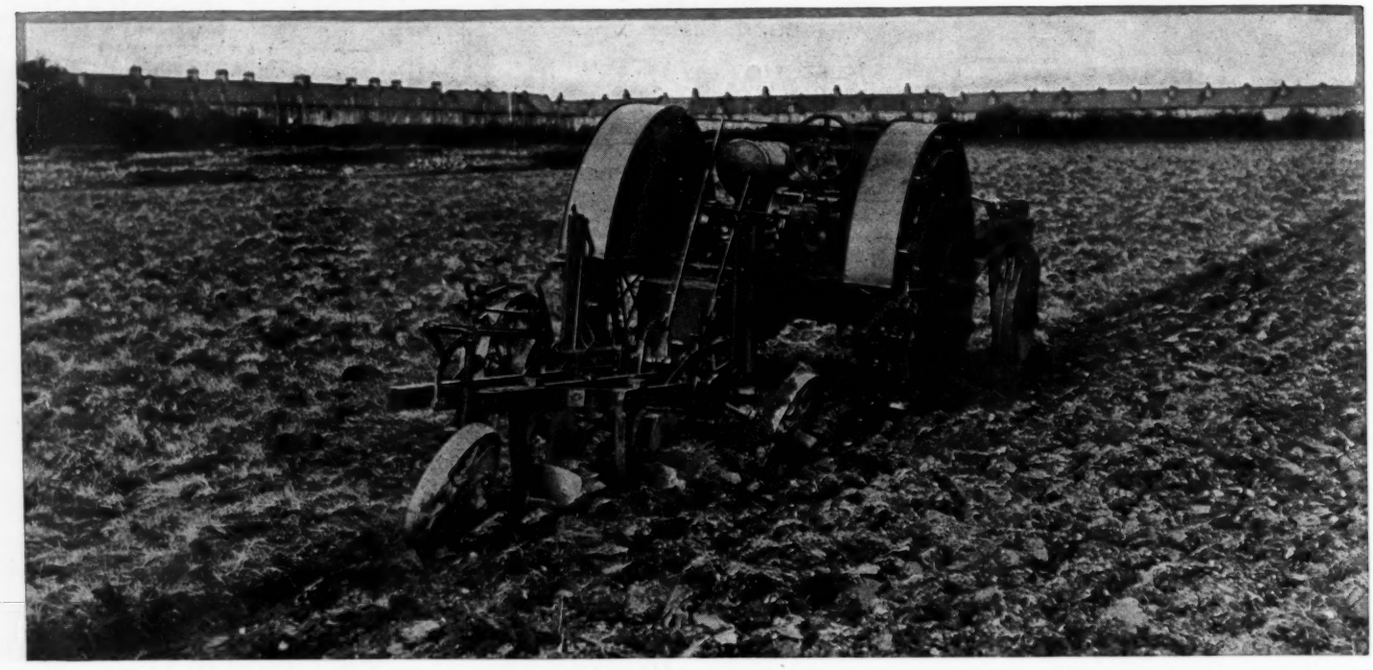


Fig. 519—End and side views of chain-driven type of Genemotor

An American Tractor in England



SOMEWHERE in England the Happy Farmer tractor, manufactured by the La Crosse Tractor Co., La Crosse, Wis., is doing its bit toward feeding a hungry world, as is indicated by the illustrations which appear on this page.

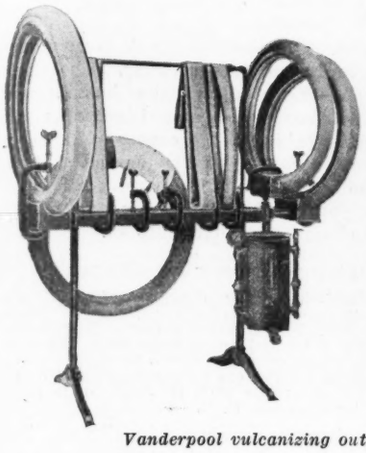
The Happy Farmer is known as the Kingsway in England, but even so camouflaged it is the same efficient machine it has proved itself to be in this country. The scene showing a plowed field might be duplicated almost anywhere in the corn belt of the United States, as the broad sweep of level land is strongly suggestive of landscapes common to this country. The companion picture, however, carries an English aspect which is unmistakable.

English Plowing

The picture of the plowed field, also, shows a radical departure from American methods in tractor plowing. The English farmer does not finish the field with the tractor but finishes with horse-drawn plows. The ragged work some inexperienced tractor operators do in this country in finishing with the tractor would suggest that it might be well to adopt the method of the more painstaking English.

Everywhere in Allied Europe American-made tractors are being employed to assist agricultural production. How many thousands of them there may be at work no one knows, but foreign farming operations are depending to a large extent upon the efficient and dependable tractors made in America.

The Accessory Corner



Vanderpool vulcanizing outfit, left, and Wells improved registration plate

Universal Battery Lamp

THE Universal battery lamp is furnished with a 3-volt battery and bulb or 1½-volt battery and bulb. The reflector is mounted rotatably, and the battery is connected rigidly to the lamp so that it will not shake loose or lose contact through vibration. The reflector can be locked in any position desirable. It is silver plated, and the light can be thrown in any direction through its use. The lamp throws a strong light 300 ft., and it is said the battery will last many months. Universal Carbon Co., Dundee, Ill.

Improved Registration Plate

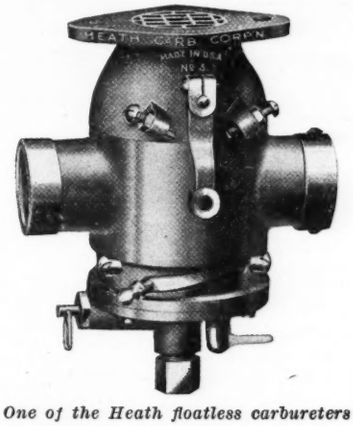
The Wells improved registration plate is an auxiliary plate to bear the numerals of the year, the year the registration is good for and the state crest, it being possible to attach it quickly to the regular registration plate. As the plates can be manufactured for a low sum and the cost of transmission would be considerably less, the matter of re-registration would be made less expensive through its use. The auxiliary plate is distinguishable at 30 to 40 ft. It is the invention of Dr. F. L. Wells, Rutland, Vt.

Panvar Finish

Panvar finish for motor cars is self-leveling and dries with a hard, glossy finish within from 6 to 8 hr., it is claimed. The finish should be applied with a soft wide brush or sprayer. It is used for waterproofing tops, preserving finish or polish of metal parts, preventing rust, redressing shoddy-appearing leather or imitation leather, tops, etc. It is transparent and can be applied to any color of body for that reason. It is weather-proof, will not discolor from heat or steam, will not crack or peel and resists heat, acid and rust, it is said. Prices, $1.50 a quart, $5 a gallon. —Panvar Co., Bulletin building, Philadelphia, Pa.

Vulcanizing Outfits

The Vanderpool line of vulcanizing outfits consists of various cavity combinations, ranging from one to four cavities. The one-cavity machine is 18 in. long for 3 and 3½ tires, a pair each of clincher and straight-side bead molds. The four-cavity is made so the steam can be cut off from any part of the machine except the center cavity for 3½ and 4 tires. In addition the company offers air bags; tire lasts; tire repair tools; rotary rasps; bench grinders; sectional steel tire-roughing brushes, etc. A machine called the Vanderpool New York combination is fitted with an 18-in. cavity for 3 by 3½ tires, one pair each clincher and straight-side bead molds; 20-in. cavity for 4-4½ and 5 tires, one pair each cylinder and straight-side bead molds; 3-ft. tube plate, tread repair mold for each pad and clamp use, 8 in. long for 3 and 3½, 4-4½ and 5, attached to side of large cavities; one each 3-3½, 4-4½ and 5 inside vulcanizers with screw drawbar to draw tire firmly; boiler, 12-in. flue and coil type combination. The price of this last is $200.—Vanderpool Co., Springfield, Ohio.



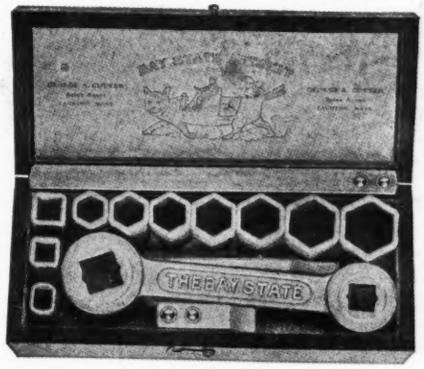
One of the Heath floatless carbureters

Heath Carbureter

The Heath carbureter embodies a substitute for the float apparatus and contains a throttle action located below the fuel nozzle which communicates full manifold vacuum to the mixing chamber. Metering of the fuel and air is accomplished by a valve floating on a current of air which flows past the fuel orifices in the fuel stud. As the throttle is opened the volume of fuel increases in a strictly defined proportion to the amount of air admitted. Idling adjustment is made by the throttle base pinion handle and the throttle lever stop-screw. Heath Carbureter Corp., Detroit.

Tire Ratchet Wrench

The No. 1 Bay State tire bolt ratchet wrench comes for $\frac{5}{16}$ and ¼-in. tire bolts and has ⅜ and $\frac{15}{32}$-in. square openings. The handle is 6 in. long. Two other models are made, each with provisions for hexagonal as well as square nuts and bolts. No. 2 is fitted for $\frac{7}{16}$ and ⅜-in. tire bolts, has ½ and ⅝-in. openings and a 7-in. handle. No. 3 is for $\frac{7}{16}$ and ½-in. tire bolts, has $\frac{13}{16}$ and ⅞-in. openings and an 8-in. handle. Prices, $12, $16 and $20 respectively a dozen.—Bay State Pump Co., Boston, Mass., maker; George A. Cutter, sales agent, Taunton, Mass.



Bay State wrench and Autokit, left, and Universal battery lamp

The Readers' Clearing House

Conducted by B. M. Ikert

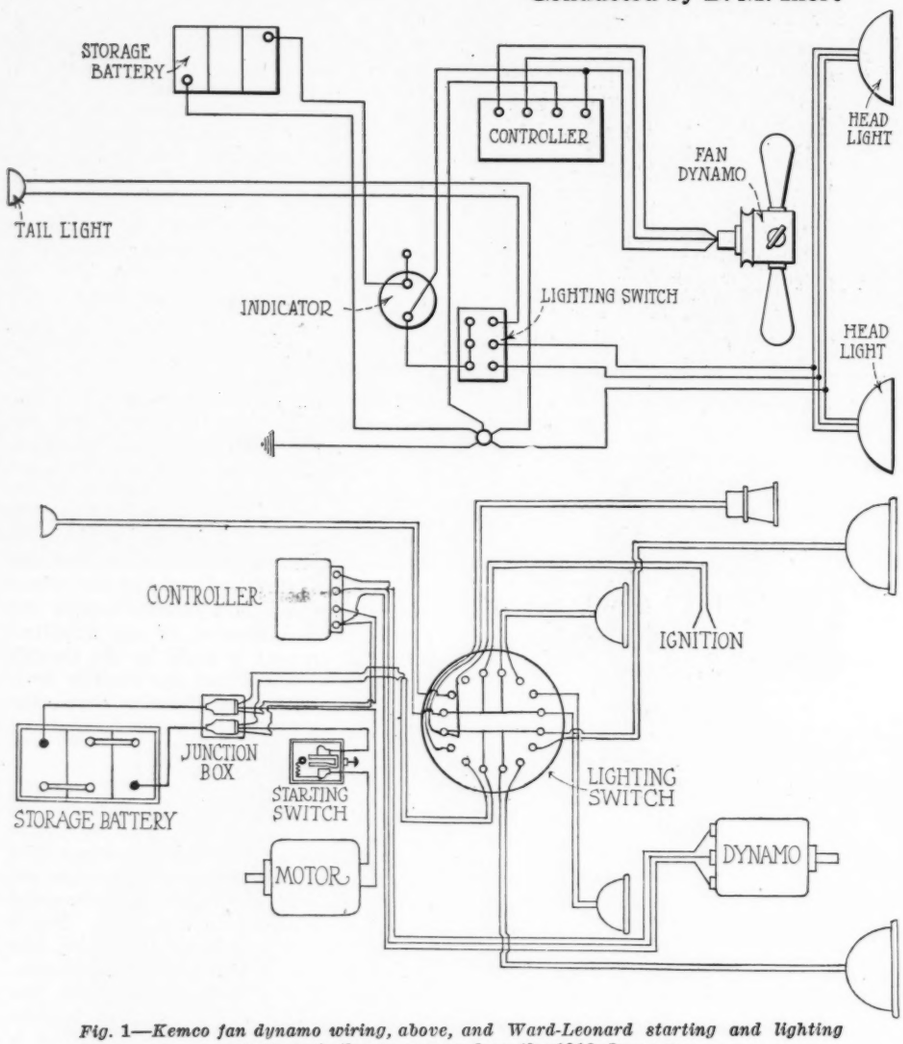


Fig. 1—Kemco fan dynamo wiring, above, and Ward-Leonard starting and lighting system similar to one used on the 1913 Jonz car

The Electric System

Delco Coil for Eight-Cylinder

Q—Can a six-cylinder Delco coil be used to take the place of one made for an eight-cylinder engine?—H. Gerviss, Chicago.

This could be done in an emergency and would work fairly well for a short time. Due to the difference in resistance of the primary windings of the coils, however, there would probably be an indication of contact point burning should the practice be continued very long.

Generator Does Not Charge

Q.—I have a 1915 Maxwell and the generator does not seem to charge the battery fast enough. Would it be possible to use 12 volts for charging instead of 6 for a short time? How would they be connected?

2—How would you wire a spotlight to take electricity off of generator without hindering charging of battery?

3—I use the storage battery on my 1915 Maxwell for ignition and cannot get a spark out of second or third plugs and first and fourth give a faint spark. What is the cause? Would it be possible to use 12 volts for ignition?—Roy Westervelt, Jackson, Mich.

1—When the engine is running the dynamo delivers its charging current, 10 to 15 amp., to the battery at 6 volts and this should be adhered to. In a system like this, where only a cut-out relay is used, it is important that the tension on the fan belt driving the generator be regulated to show the proper charge on the ammeter. If the ammeter shows a charge of less than 8 amp. the belt should be tightened. Suitable adjustment is provided by a slotted segment and set bolt on the fan support. A tight belt, of course, tends to speed up the generator and increase the charging rate, while a loose belt increases slippage, thereby decreasing charging rate.

2—This would be hard to do, as the moment you take current from the dynamo you deprive the battery of current.

3—Six volts are plenty for ignition. Failure to get a spark may be due to defective plugs, wiring or terminals. Are you sure the battery is not exhausted? See that the contact breaker is in good shape on the magneto, as this is used in connection with the battery system when starting the engine. See that the bell crank lever moves freely in the contact breaker. The shaft of this lever works in a fiber bushing and must not be lubricated. Disconnect the grounding cable on the center of the contact maker cover. If the engine still refuses to start, look at the gap in the interrupter points. The break or gap in the points should be about 0.015 in.

Wiring Ammeter on Chalmers

Q.—Publish wiring diagram of Chalmers, model 26, using Westinghouse 18-volt single unit starting and lighting system. The motor-generator is located under front seat. Show in diagram where ammeter should be cut in. Where can such an instrument be purchased and would the price offset the good it would do?—R. S. Curry, Washington, D. C.

This diagram is shown in Fig. 2. The ammeter is connected in the positive generator line and the positive terminal of the ammeter must be connected with the positive terminal of the generator. The terminals usually are marked on the instruments. They are useful in determining the amount of current being consumed, or generated. Most supply houses can furnish ammeters, or by referring to the advertising section of MOTOR AGE you will find makers of these.

Probably Bad Short-Circuit

Q.—I have a 79 Overland with a Gray & Davis starting system. There is a short-circuit somewhere, for as you push the button to start the engine the lights all go out. Please explain. The engine gets its first ignition from dry cells. It has a low-tension magneto. I have tried to connect to the storage batteries. Where should I connect? I have tried connecting by hooking one wire to positive and the other to negative on storage battery, but nothing resulted. I have taken the starting cables out, and it then will start. I have also hooked to the positive and the other to ammeter, which ought to give it a circuit because the ammeter connects to the cable that leads to the negative post.—Frank Saller, Fort Madison, Iowa.

It appears from this that your trouble is in the starting switch. A bad short-circuit generally is indicated when the lights appear to go out suddenly in this manner, but in reality they glow very faintly. Look for loose contacts in the starting switch, and if there is any place where the copper appears to have been burnt, polish it with a little fine sandpaper.

Ammeter Does Not Register

Q.—I have a Jonz car, which was made in this city in 1913 by the American Motor Car Co., and which is now an orphan. Car has Model E, four-cylinder Continental engine, Bosch magneto, Kemco generator, Ward-Leonard lighting and 6-volt storage battery, ammeter on dash, electric head, side, dash and tail-lamps, the dash and tail lamps being in series, operating from one push button, separate buttons for side and headlights, electric horn. Sometimes my ammeter does not register charge or discharge when lights are on and engine running, and sometimes it does register. When it does not register, I can only get light by running engine and lights burn brighter or dimmer as the engine speeds up or slows down. I am overhauling the car now and do not know where to look for electrical trouble. Give me complete diagrams both for ignition and lighting wiring. If I cannot locate my short or whatever is causing the trouble, would like to rewire and should like to have diagram. The Kemco generator has three wires, marked A, B, and C. Mark these in diagram accordingly. Advise if I should go into the generator and clean it. It has the fan on outside of it and looks like it is dustproof, but I do not see where I can oil it.—C. E. Emery, New Albany, Ind.

MOTOR AGE has no wiring diagram of

this car, but we are showing in Fig. 1 diagrams of the Kemco generator system and also the Ward-Leonard used about that time on other cars. From these perhaps you can trace out your own installation. The fact that your lights burn brighter as the engine speeds up leads us to believe the cutout needs attention. Thus you would be running direct from the generator and not from battery which supplied the current when the engine is not running. The best thing to do with these parts if they are out of order is to take them to a service station.

Wiring of 35 Oakland

Q.—Give diagram of lighting system used on Oakland touring car model 35 with Deaco starter and Westinghouse ignition.—A. Rudow, Toledo, Ohio.

A wiring diagram of the Deaco starting and lighting system as used on the Oakland 35 is shown in Fig. 5.

Twelve and 6-Volt Systems

Q.—What is the advantage and disadvantage of the 12-volt system as applied to the ignition and starting system on motor cars?—Fred Vandewark, Windsor, Col.

In most cases where 12 volts are used, the wiring is such that the full voltage is used for starting, while for ignition and lighting only 6 volts are used. For instance, the battery in the Maxwell is a 12-volt, but in reality it is made up of two 6-volt batteries put into one case. Naturally 12 volts would appear to be better for starting purposes, although many makers claim 6 volts are enough.

Timing Splitdorf Magneto

Q.—Explain fully the timing of the armature of a Splitdorf magneto used on a 1912 Studebaker 20. How should the gears that run the armature be timed to open the points of the timer at the right time? Should the points open when the draw is the greatest or just before or after? In what position is the armature when the points open? If the points are not adjusted right would the engine miss the same on the battery as on the magneto?—G. E. Sheets, Lafrance, Ohio.

Refer to Fig. 4. This shows a sectional view of this magneto in the right-hand and left-hand drives. Notice that the distributer segment is on contact A and the armature is in such a position that at the top it is just $\frac{1}{16}$ in. from the pole piece. This is with the interrupter housing in the advanced position, at which time the points S are just about to open. If the points are not adjusted to open and close at the right time, missing will occur on both systems.

Wants to Change Lighting

Q.—I have a Maxwell 1915 with Dixie magneto and wish to change the lighting to a two-wire system and cut out the dimmer. Publish a diagram for same.

2—Could I use two 6-volt 80-amp. storage batteries in place of the one 12-volt battery? I notice it is connected up as two separate batteries with four leads coming from it.

3—I notice a coil or resistance attached to the frame of car near the front with wires leading to the lights. What is the use of same?—G. R. Shaw, Los Angeles, Cal.

1—We do not think it advisable to change to a two-wire system. It means about double the amount of wire necessary and modern tendency is for the one-wire system. Should you care to make the change, however, it will only be necessary to remove the ground connection from the battery, lights, etc., and run wires from the lights, etc., to the terminal of the battery that formerly was grounded. The frame of your car at present constitutes the return circuit and functions the same as a wire would. Hence you need only replace the frame with a wire.

2—You could use two batteries for this. The battery used with this system is a 12-volt outfit, split in halves to permit increased voltage on starting. Each half is a distinct 6-volt battery in itself, but both are contained in a single case.

3—This is a transformer coil to intensify the spark at slow speeds and starting. The starting operation is facilitated by a dual system of ignition, whereby besides high-tension current from the magneto, a dry battery and coil circuit automatically is inserted when the switch is in the starting position.

Wiring Ford for Battery

Q.—Publish wiring diagram for Ford touring car from storage battery. I want to use battery for headlamps, taillamp, horn, spotlight, dimmer for headlamps and have it so I can switch on battery for starting also.—L. E. Dickson, Crestline, Ohio.

In Fig. 3 is shown a wiring diagram for Ford car equipped with storage battery. You cannot use the battery for starting, inasmuch as you would not have with this layout a starting motor and the other apparatus necessary. The diagram shows the regular headlights connected to the magneto in the regular way, but the auxiliary lights can be switched on when the car is standing or the lights are wanted dim. The auxiliary bulbs can be placed in the top of the headlamps. The taillight is provided with a separate switch, and the spotlight generally has a switch incorporated in it.

TO assist readers in obtaining as a unit all information contained in this department on a certain subject in which they may be most interested, such as ignition, carburetion, etc., MOTOR AGE has segregated inquiries into classes of allied nature. Questions pertaining to engines will be answered under that head, and so on.

THE ELECTRIC SYSTEM

H. Gerviss.....Chicago
Roy Westervelt.....Jackson, Mich.
R. S. Curry.....Washington, D. C.
Frank Saller.....Fort Madison, Iowa
C. E. Emery.....New Albany, Ind.
A. Rudow.....Toledo, Ohio
Fred Vandewark.....Windsor, Col.
G. H. Sheets.....Lafrance, Ohio
G. R. Shaw.....Los Angeles, Cal.
L. E. Dickson.....Crestline, Ohio

ENGINES

A. Northrup.....Buffalo, Wyo.
William Kopp.....Santa Barbara, Cal.
J. Stockland.....Bismarck, N. D.
Reader.....Longmont, Col.
J. Jenkins.....Grand Rapids, Mich.
J. Sarles.....Chicago

MISCELLANEOUS

William Blethyn..North Lawrence, Ohio
J. Meyer.....Lincoln, Neb.
Reader.....Chicago
J. H. Godfrey.....Luverne, Ohio
M. Torgerson.....Wheaton, Minn.
Reader.....Maddock, N. D.
J. A. Neren.....Roanoke, Va.
R. Beatty.....Stanford, Mont.
P. F. Stahl.....Meyersville, Tex.
E. V. Zeidler.....Palto Alto, Cal.

REBUILDING

William Olson.....Fonda, Iowa
G. E. S. Hugh.....Lee, England
J. Werner.....Chicago
R. Kincaid.....Orlando, Fla.
C. E. White.....Ennis, Tex.
Lester Clingman.....Le Mars, Iowa

No communication not signed by the writer's name and address will be answered in these columns.

Engines

Valves on New Buick

Q.—Having noted the change in the valve size on late model Buick cars, I am curious to know why the intake valves are made so much larger than the exhaust?—A. Northrup, Buffalo, Wyo.

This was probably done to give the incoming charge a chance to get into the combustion chamber quicker, which is very necessary with the fuel we are getting at the present time. The quicker the charge gets in and is fired, the less chance for condensation and resultant running down on the cylinder walls into the crankcase. The exhaust gases usually get out quick enough, hence these were probably kept down to a smaller size. Also, a larger valve warps easier than a smaller one, and as the exhaust valves are subjected to a great amount of heat, this is probably another reason why the exhausts were made smaller than the intakes.

Engine Misses at Low

Q.—I have an Oakland six, 1916 model. The engine seems to miss at low speeds, below 10 or 15 miles on one or two cylinders. When the engine speeds up about 15 m.p.h. it then seems to hit on all cylinders. I have not yet been able to tell what does this, as the car has been run a little over 9000 miles and been well cared for. This engine has the Remy system of ignition. We have put a Wilmo manifold on the engine and this seems to help some, but does not remedy the trouble entirely.—R. H. Robinett, Henning, Ill.

We suggest that you look at the distributer points and also the gaps at the plugs. The contact points should be dressed with a very fine flat file and present prefectly

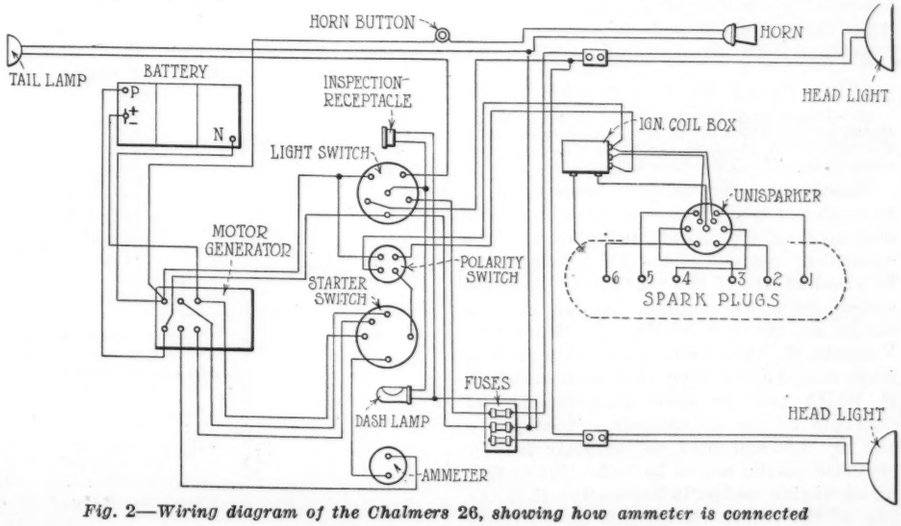


Fig. 2—Wiring diagram of the Chalmers 26, showing how ammeter is connected

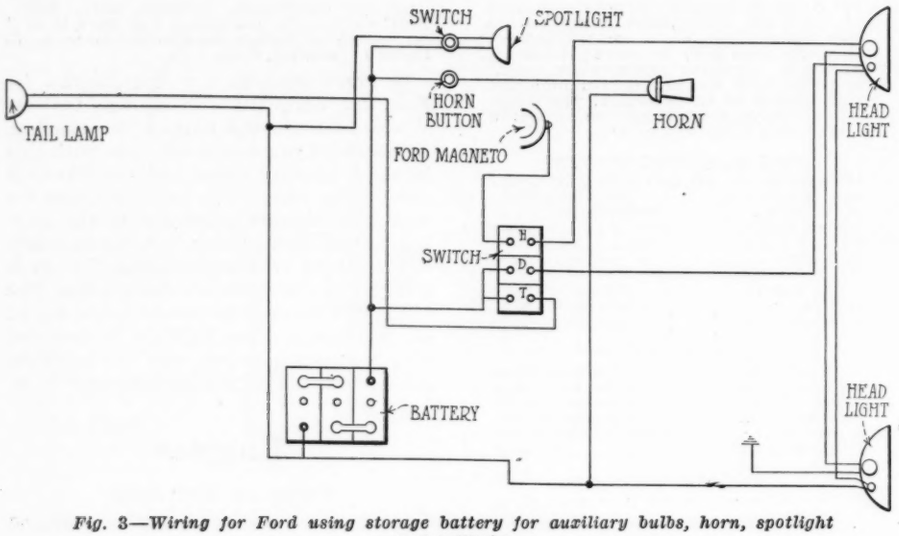


Fig. 3—Wiring for Ford using storage battery for auxiliary bulbs, horn, spotlight and taillight

smooth surfaces. The contacts should be adjusted with the wrench provided so that the maximum opening is 0.020 to 0.025 in. The rebound spring should be at least .020 in. from the breaker arm when the contacts are at maximum opening. For best results see that the gaps at the plugs are from 0.025 to 0.030 in. If the engine misses when idling or at low speeds the gaps at the plugs should be wider.

Weak Valve Spring Trouble

Q.—Would weak valve springs have a tendency to cause the engine of a 1910 Dorris to misfire at high speeds? I have put washers under some of the springs and seem to get better results. The pushrod ends of the rocker beams were considerably worn, and I have had same filled in with bronze, and the car works better since. The engine starts very easily and when warmed up will start from Atwater Kent ignition button on dash, but I think some of the rings leak a trifle. Could this be remedied by installing non-leaking rings?—William Kopp, Santa Barbara, Cal.

Weak springs will cause an engine to misfire, because they are not strong enough to bring the valve back to its seat with sufficient rapidity. The heat weakens the exhaust valve springs and thus cuts down their efficiency. Springs are comparatively cheap and their replacement is advisable when the engine lacks power from this source.

Various patented piston rings are designed to prevent leakage. Turn to the advertising columns of this issue and note what the makers of such rings have to say regarding their effectiveness.

Lining Up Crankshaft

Q.—Please give diagram with explanation on lining up a crankshaft in a tractor engine. Does the rule hold good in motor car engines and steam engine?—J. Stockland, Bismarck, N. D.

When new bearings have been fitted in an engine it is necessary to check up on the alignment of crankshaft and pistons. The connecting rod and piston pin bearings can be checked up, if the parts have been removed from the engine, by the method shown at the top of Fig. 7. Here two V-blocks, A, have been placed on a surface plate and the rod supported on a mandrel, B, which has the same diameter as the crankpin on the crankshaft. Needless to say the mandrel must be perfectly true if accurate results are to be had. The design of an engine makes it imperative that the top of the piston be parallel at all times

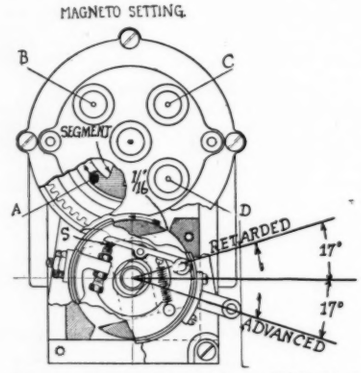


Fig. 4—Splitdorf magneto in 1912 Studebaker, showing how the distributer gear is timed

with the center line of the crankshaft, hence if a height gage fitted with pointer is placed on the surface plate the pointer should touch equally the straight edge on the piston at all positions.

If the pistons and rods are in position on the engine the alignment easily can be tested as shown in the lower part of the illustration. The top surface of the joint between crankcase and block is planed perfectly true, so that if a square is placed on it and against the pistons it will indicate whether everything is lined up correctly. The same rule holds on other engines, but sometimes a deviation has to be made on account of local conditions.

Suspending Powerplant

Q.—What other ways of engine suspension are there besides the three-point? Would an engine suspended at two points be considered radical?—Reader, Longmont, Col.

The four-point suspension method is used a great deal. Here the engine is suspended from the car frame by four arms, two on each side. Engines have been suspended from two points, notably those of the revolving type, in which a bearing is placed at the front and rear of the engine supported on cross members. This really resolves itself into a three-point suspension, as the rear cross member is fastened at two points on the frame.

Needs New Camshaft Bushings

Q.—Will a camshaft front bushing that is badly worn in a Ford engine cause the camshaft to knock and cause a misfire at times in the engine? The timing gears are somewhat wobbly and the camshaft is very loose.—J. Jenkins, Grand Rapids, Mich.

It is quite likely that a worn camshaft bearing in the front of the engine will cause misfiring because the bushing may be so loose that it is not held in position by the screw in the side of the crankcase allowing it to turn in such a way that the pushrod on No. 1 exhaust valve does not come all the way down. Refer to Fig. 6. Note that the bearing has a cut in it, marked A, which must be on top when the bearing is in proper position, so the pushrod will come all the way down. Bear this in mind when you fit a new bearing, for many strange causes of Fords misfiring finally are traced to the front camshaft bushing improperly installed. To remove the camshaft take off the plate on front of the engine and remove the two set screws in the right side of the engine opposite the camshaft. These are on the outside. Place a small nail or cotter pin in the holes

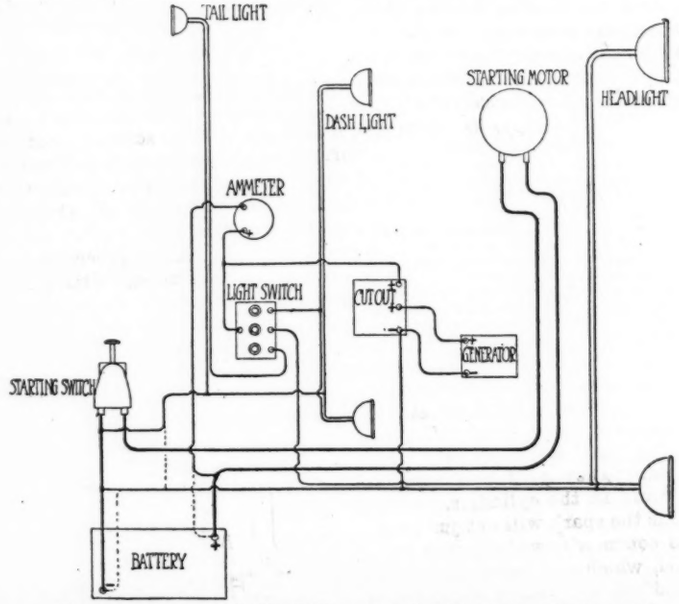


Fig. 5—Wiring of Oakland 35 equipped with Deaco starting and lighting system

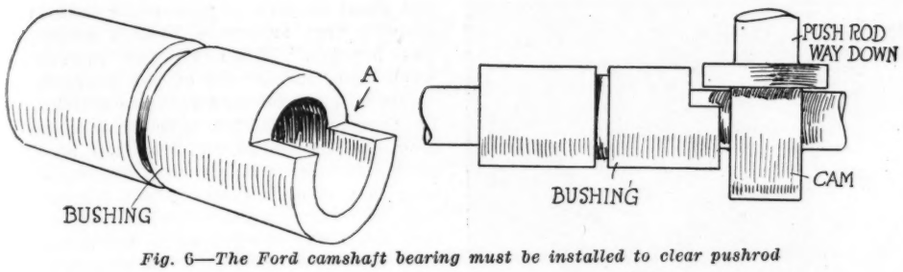


Fig. 6—The Ford camshaft bearing must be installed to clear pushrod

on top of the pushrods, so they will not drop down and the camshaft easily can be pulled out, bearings and all. The latter are held together by a spring, which need be only slipped off and replaced on the new ones. There should be but the slightest play in the camshaft bearings, otherwise the engine will not perform well.

Various Engine Queries

Q.—What are the different causes of piston sizing? Does the piston clearance change with different sized pistons, or is there a standard allowance?

2—What is the best test to give an engine to tell if you are getting the best results out of it and whether the ignition is early or late? Which engine will give the most speed and power, a long or short stroke engine?—J. Sarlos, Chicago.

1—Pistons may size when fitted too tight or through lack of lubrication. The clearance is the same for different diameters, but aluminum-alloy pistons are given a greater clearance than cast-iron pistons.

The best test for an engine is to note its all-around performance, fuel economy, acceleration, flexibility, etc. If it is responds to the throttle instantly, the chances are the ignition is timed about right. If with the throttle opened the engine does not pick up in speed very quickly, it would indicate that the spark takes place too late. This is with the spark lever in the advanced position.

The power developed by an engine depends upon its design. Some short-stroke engines may develop more power than a long-stroke, and vice versa. As a rule, though, the long-stroke engine is preferable and this fact is substantiated on racing cars, the engines of which nearly always are of the long-stroke variety.

Compression Pressure

Q.—What is the compression per square inch in the combustion chamber of a 7W Continental engine of 3¼ in. bore and 4½ in. stroke.—C. D. Purinton, McCook, Neb.

The compression per cylinder is 66 lb. per square inch.

Miscellaneous

Ford Starts Hard

Q.—What is the cause of a Ford starting hard? It has a good magneto and storage battery and gives a good spark. After it is primed and hot water poured on the manifold it finally starts and then runs fine.—William Blethyn, North Lawrence, Ohio.

Hard starting in your case may be due to poor gasoline, poor compression, cold engine, poor carburetion or weak spark. The plugs may spark all right when out of the engine, but remember they must fire under considerable pressure in the cylinders. If the gap is too wide the spark will not jump. Hard starting is common nowadays owing to the heavy fuel, which condenses on the walls of the manifold and runs back into the carbureter. Once the manifold gets warm condensation is not so great and hence the engine starts easier and performs better. That is why your engine starts when you pour hot water on the manifold.

Wants Cyclecar Plans

Q.—Where can I obtain information relative to the cyclecar? Would like to get plans for building a cyclecar using a twin-cylinder motorcycle engine for motive power.—J. Meyer, Lincoln, Neb.

There is not much cyclecar information to be had at the present time, as practically all the makers of these cars have abandoned manufacture. Several books relate to the construction, care and operation of cyclecars, and one is "Motorcycle, Sidecars and Cyclecars," by Victor Page. If you will refer back to some of the issues of MOTOR AGE of 1913, 1914 and 1915 you will find these vehicles discussed quite fully under the subject Cyclecar Development.

Most of the present-day cars are constructed by the owners, and consequently it would be a difficult matter to get hold of a set of plans. You might try writing the Tribune Engineering Co., Owego, N. Y., which concern, we believe, is furnishing cyclecar parts.

Removing Torque Arm Rattle

Q.—What can be done to take the rattle out of the torque arm on a Studebaker? We have tried tightening it, but the threads break in the gearcase where it is bolted. Can this arm be taken off with safety to the car?

2—What can be done to take the squeak out of the wheel rims? It has been down to a service station a few times for repair, but they could not take the squeak out?—Reader, Chicago.

1—Do not attempt to run the car with the torque arm removed. It plays a very important part and it would be dangerous to proceed without it. If you have stripped the threads, fit larger bolts, cutting new threads with a tap. See that there are lock washers under the cap screw heads. Remember also that with lock washers under the heads the screws need not be turned up so tightly, just enough to completely flatten the washers. Setting them up too tightly results in stripping the threads.

2—When all other processes, such as tightening the bolts, fitting oversize wedges, etc., fail to eliminate the squeaks, an application of graphite to the surfaces may prove effective. A squeak is always a sign of lack of lubrication, whether it be between bearing surfaces or body joints. Body and rim squeaks very often can be reduced by a little lubrication.

Specifications of Thomas

Q.—Where is the Thomas car manufactured, or is it an orphan car? Does it carry an L, T, or valve-in-head engine? What electrical equipment does it have?—J. H. Godfrey, Luverne, Iowa.

The Thomas car was built by the E. R. Thomas Motor Co., Buffalo, N. Y. It is no longer made. The engine of this car was a T-head. The only electrical equipment consisted of two separate and independent systems of ignition, the current supply being from a high-tension Bosch or Eisemann magneto and the other from a battery system using a 6-volt, 40-amp. battery.

Oil, Tires and Rubber

Q.—Is there any way, outside of chemical analysis, of judging when oil contains too much gasoline for satisfactory lubrication?

2—Does it require more power to drive a car with pneumatic tires over a smooth surface than if it had steel tires?

3—Is there any substance that will protect rubber tubing from gasoline?—M. Torgerson, Wheaton, Minn.

1—Oil tests are hard for the average owner to conduct. The safest way is to drain the crankcase more frequently than before, as with the heavy fuel we are burning now if carburetion is not the best and the thermal efficiency of the engine kept as high as possible, there will be much crankcase distillation, owing to the heavier particles of fuel running down the cylinder walls.

2—On a very smooth and level surface the car fitted with steel tires would move with less friction between the surfaces than the one with rubber tires, inasmuch as rubber offers more resistance. But steel tires do not insulate the car mechanism against shock like the rubber tires do.

3—MOTOR AGE does not know of any such substance.

Oil Pump on Overland

Q.—I have an Overland roadster, model 46, on which I removed the oiler run by an eccentric and installed an oil pump of the same type as the one used on the present model 90 Overland by making a hole through the crankcase and mounting the pump on the outside. This being a plunger pump, it runs by the exhaust cam. I rounded the plunger of the pump about the same as the valve tappets. The engine runs fairly quiet when in high on the road, but when running idle it knocks at the pump. Will it help to give the plunger more room by cutting off a part of the length of the plunger and the spring inside same? In making use of this pump I put on a new crankcase with pipe leading from the pump to the timing gear cover and the other to the constant-level pan. I have dippers on the lower end of the connecting rods. I also have a sight oiler on the dash of same

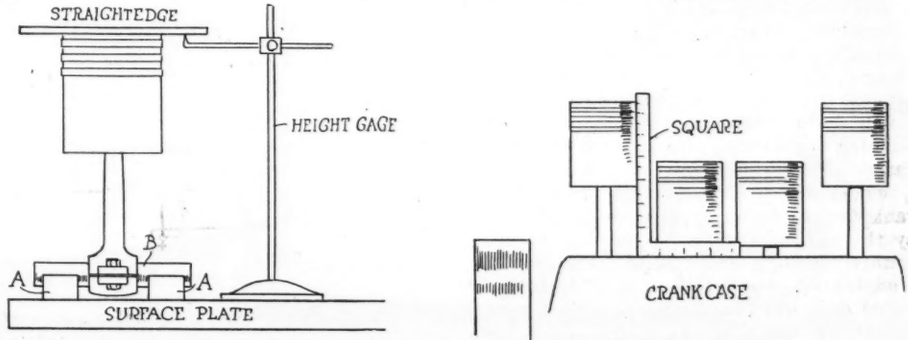


Fig. 7—Two methods for testing parallelism of crankshaft and piston bearings

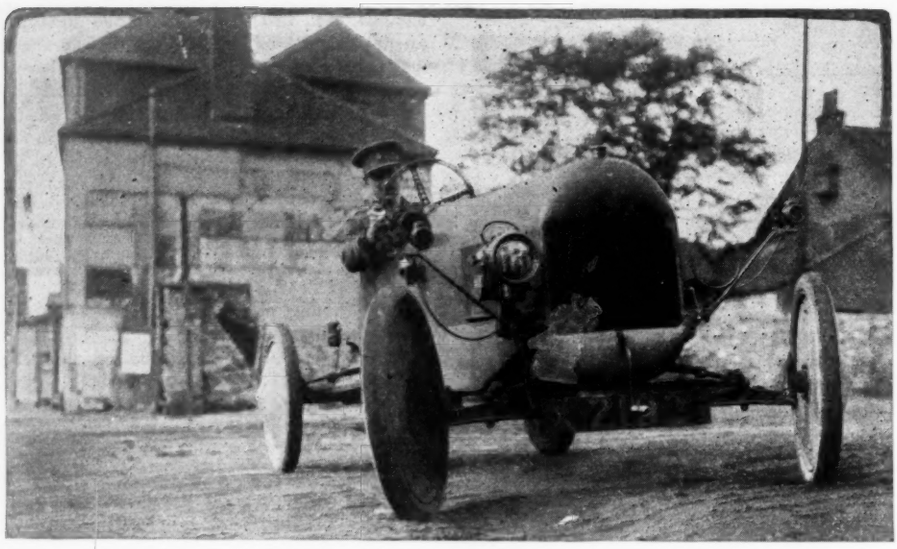


Fig. 8—Reader's rebuilt Ford. The steering wheel is of boiler plate, drilled to make it lighter

type as the Overland 90. I placed a new felt washer in the timing gear cover around the front end of the crankshaft, but the oil still works out there. What would be the best way to overcome this?

2—How can I reduce the pressure of the oil pump to the best advantage? I have made the holes somewhat larger in the leads to the splash troughs.—Reader, Maddock, N. D.

1-2—You can cut off part of this plunger, provided it does not cut down the efficiency too much. From your second question we are inclined to think that you will be safe in cutting off some of the plunger as this will reduce the pressure also. Another way would be to fit a relief valve with screw adjustment so that turning the screw to the right would increase the pressure and to the left decrease it. The adjusting screw should have a locking means on it, like a locknut.

Probably Dragging Clutch

Q.—I have a Chalmers car model B-26. When moving gear control from neutral to first gear and from first to second a rattling of the gears is experienced, and upon inspection I find that when the clutch is thrown out as far as possible the propeller shaft still revolves. Is it the fault of the transmission, which is situated in the rear, or the clutch? Is it proper to fill the clutch full of a mixture of coal oil and engine oil?

2—Will any internal obstacles be met with in removing crankcase?—J. A. Neren, Roanoke, Va.

1—The trouble which you are experiencing is due to a dragging clutch; in other words, when the clutch is thrown out the driven disks do not release fully; consequently, the propellor shaft continues to revolve. It is probable that this trouble is due to the position of the clutch disks, and it is suggested that you drain out the present lubricant in the clutch, replace the drain plug, and then put in about 1 qt. of kerosene. Start the engine and let it run at idling speeds for several moments. During this period place the foot on the clutch pedal and ease the clutch in and out. This will have a tendency to wash out the clutch inside and also cleanse the clutch disks. After this has been accomplished remove the drain plug and draw off the kerosene. Again replace drain plug and then put in the clutch housing approximately 1 qt. of half and half kerosene and engine oil, using this as a lubricant. If this does not remove the trouble the possibilities are that the clutch disks have been damaged or cut. If this is the case, the only thing to do is to replace the disks with new ones.

2—The question is not quite clear but you evidently mean to remove the lower half of the crankcase; in other words, the reservoir. If this is what you desire to do there will be no external or internal obstacles to be met with, as this is merely a pan which covers the crankcase and also acts as an oil reservoir.

Tempering Small Parts

Q.—What kind of oil and degree of heat should be used on expansion reamer? Can an expansion reamer be retempered after going through a fire? Can taps be retempered and how and what with?—R. Beatty, Stanford, Mont.

Sperm or cottonseed oil generally is used for hardening small parts and springs. Taps, dies, reamers, etc., are heated to about 500 deg., at which they take a yellowish brown color. If not damaged too greatly, the reamer can be retempered.

A good way to temper taps, etc., is to put about an inch of pure white sand in a suitable tray supported over a series of gas burners. When all the impurities have been burned out of the sand, false colors will not be shown on the articles to be tempered. If the articles are small they can be placed right on top of the sand, otherwise it is best to bury them, letting just enough show to see the color. Taps and reamers after hardening and before tempering are ground in the flutes to show the run of the color. The rise in temperature should be gradual and the surfaces of the articles closely watched for the first change in color. A brown yellow at about 500 deg. F. is used for taps, etc. The color starts with a faint yellowish tinge, gradually changing into a straw yellow and next into the brownish-yellow.

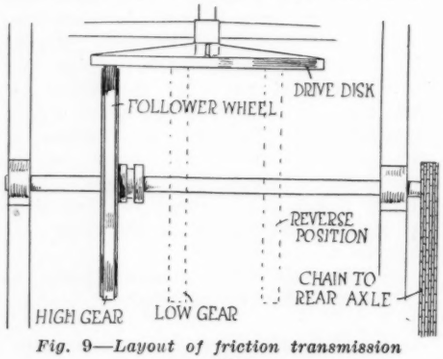


Fig. 9—Layout of friction transmission on Metz

Hotchkiss Drive Explained

Q.—Explain the Hotchkiss drive, also the gearless, friction-drive clutch on early model Metz cars.—P. F. Stahl, Meyersville, Tex.

The use of Hotchkiss drive is confined to cars equipped with long flat semi-elliptic rear springs which usually are slung under the axle housing to bring the driving line in as straight line as possible. Due to action of the torque arm and radius rods the rear springs must be attached rigidly to the housing, being pivoted at the forward end and shackled at the rear to maintain the rear axle in alignment with the remainder of the chassis. The springs must be strengthened also as they take up the driving and braking reaction. This is accomplished by fitting a very heavy main leaf in the spring, together with stronger hangers and bolts. Hotchkiss drive simplifies chassis construction, as it eliminates such parts as radius rods, torque arm, etc.

The friction drive used on Metz cars is shown in Fig. 9.

Acceleration On Rich Mixture

Q.—With carbureter set lean and by closing the choker a correct amount should I get as fast an acceleration as if carbureter is set rich?

2—Will engine attain a higher speed by a rich or lean mixture? When using a rich mixture my car has a very fast acceleration but can get only about 10 m.p.g. of gasoline. With a lean mixture I get slow acceleration but about 18 m.p.g. What I want is fast acceleration at times and economy at other times. By fitting a hand-controlled auxiliary air device and setting the carbureter rich with the air all shut off I would get fast acceleration. By turning the air on the mixture would be less rich under the last case. Could I get approximately the same miles per gallon as when the carbureter is set lean?—E. V. Zeidler, Palo Alto, Cal.

Better acceleration is possible with a mixture that inclines on the rich side, although there is sometimes danger of the engine choking, if the mixture is fed in too large quantities. At low speeds the mixture always should be richer than at high. The reason is that at higher speeds there is less loss due to leakage and heat. A lean mixture highly compressed burns faster, with better economy and all-around

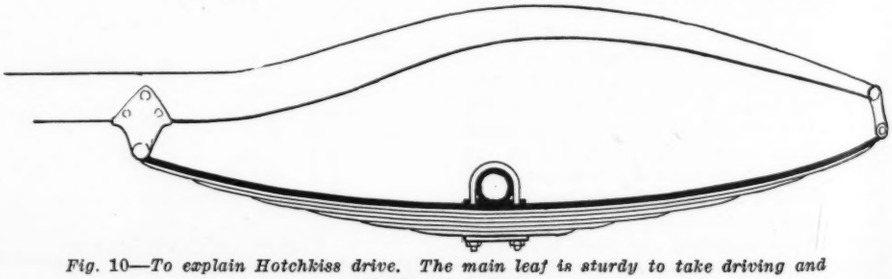


Fig. 10—To explain Hotchkiss drive. The main leaf is sturdy to take driving and braking reaction

engine performance. You can set your carbureter to give a comparatively rich mixture when accelerating with the air adjustment arranged to cut off most of the air. Then when you get going you can push in or pull out the auxiliary air arrangement to give the necessary lean mixture for running.

2—A rich mixture does not only waste fuel but it often results in causing the engine to load up, that is, it chokes the engine. On the other hand a weak mixture starves the cylinders and full engine power is not realized. However, the latter is to be preferred to an over-rich mixture. Naturally the best mixture is the one in which just the right amount of air is furnished to completely atomize the gasoline. Roughly speaking this is about 14 to 1 as regards the ratio of air to gasoline.

Rebuilding

Wants Overland Speedster

Q.—I have a five-passenger model 59 Overland which I would like to convert into a roadster. Show diagram.—William Olson, Fonda, Iowa.

A suggestion for converting this car into a speedster was shown in the Reader's Clearing House March 28.

Lowering Ford Frame

Q.—Give particulars of how to lower a Ford chassis.—G. E. S. Huth, Lee S. E. 12, England.

A method for lowering the Ford frame was shown in the March 28 issue of MOTOR AGE in the Reader's Clearing House.

English Rebuilt Ford

Lee S. E., England, Editor MOTOR AGE —I was very much interested to note your reply to my letter asking for particulars of the sixteen-overhead valve fitment for Ford cars. I believe that in my original letter I particularly asked for information as to the lowering of a Ford chassis, as this apparently presents some slight difficulties which in all probability have been overcome by some ingenious person amongst your numerous contributors.

I inclose a photo of a Ford which I was running before petrol restrictions in this country precluded one from using a car at all. It might interest you to know that this vehicle is of 1911 pattern and was purchased by me practically off the junk heap for $125. I put in a 2 to 1 gear and a K. W. magneto and fitted an Air Friction carbureter with the result that in spite of her age and the hard work which she must have done, I was able to get 65 m.p.h. out of her on the road. The radiator is a standard Ford radiator with a new domed copper top, which, I think you will agree, distinctly improves the appearance. The steering wheel is made out of an old piece of boiler plate and the body out of oil drums and old scrapper stuff.—E. S. Huth.

Wants Four-Passenger Speedster

Q.—Illustrate how I can rebuild my 1915 Ford chassis into a snappy four-passenger raceabout, seats low on floor, with top such as Paige sport model, but very low.

2—Can the magneto be taken off the Ford engine and the engine run satisfactorily in a car on a Bosch magneto if I use a 6-volt battery for starting, or is it necessary to replace the ordinary magneto with a different flywheel. My magneto is dead.

3—Explain the difference between a low-tension and high-tension magneto. How can one be distinguished from the other?—J. Werner, Chicago.

1—Numerous illustrations have appeared from time to time in the Reader's Clearing House showing how cars might be reconstructed, and we believe by combining some of these you will be able to get composite construction that will meet your requirements. Do not place the seats too low, as they are uncomfortable for long distances. The Ford car hardly lends itself to low seats, unless some radical changes are made in the chassis, such as underslinging the frame, etc.

2—You can fit new magnets on the flywheel of your engine or have the old ones recharged. You can use a 6-volt battery for starting and then switch over to the Bosch magneto. With good compression, mixture, plugs, etc., you may be able to start on the magneto alone.

3—A low-tension magneto has its armature wound with primary wire only and requires a secondary coil to step up the voltage. On a high-tension magneto the secondary winding is wound on top of the primary. Such an instrument is further equipped with condenser, etc. In fact, it is a complete ignition system, excepting for plugs and wire.

Ford Into Speedster.

Q.—Publish a drawing of a Ford speedster, with low-built, torpedo-shaped back, with different shaped radiator, etc., and give price of building such a body. It has not been shown as yet. I want to build my Ford into a classy racer. —R. Kincaid, Orlando, Fla.

An illustration for a Ford speedster is shown in Fig. 11. In last week's issue there appeared an article on sixteen-valve Fords, in which there was pictured side and front views of the Laurel Motors Corp., Anderson, Ind., racing cars. This should give you a good idea as to what can be done along these lines. A body could probably be built for $100 to $200, depending on whether you do most of the work.

Building Car for Speed

Q.—I am building a car for speed. I am using a Stoddard-Dayton engine; 1914 Chalmers 36 frame, front and rear axle. I want to make this car with 100-in. wheelbase and use it for racing. I would like to know the best way to fasten the rear spring to the frame, as I want to do away with the top quarter of the rear spring. Where would be the proper place to set the engine? The weight of it is 1150 lb.

2—What would be the proper length of the springs and the number of leaves for spring?

3—Give proper length for steering post and the best position to place the steering gear on the frame. I want to use a gear that will set on top of the frame. Also give length of the steering arm from steering gear down to the drag link.—C. E. White, Ennis, Tex.

1—It is going to be quite a job to fit the springs to this frame in the way you mention on account of the peculiar shape of the frame. The frame was designed for three-quarter elliptic springs, and hence to attempt fitting semi-elliptics means considerable changing. It may be that you could remove the upper spring and substitute for it a short length of channel material bolted or hot-riveted to the frame. The spring then could be attached to this with a shackle. This would not alter the wheelbase, and if you want to change to a 100-in. wheelbase our advice would be to get a new frame, one with a good sweep over the rear axle so you can fit your springs rather flat.

The proper place for the engine can be determined only by experiment, as no two home-built racing jobs are alike. As a general thing the engine must be moved back, anywhere from 6 to 12 in.

2-3—The number of leaves and length of springs can be disregarded so long as the springs insulate the car's mechanism from vibration and still support the weight properly. The best thing to do with your springs is to take the matter up with a competent spring concern, stating the weight you are going to carry, style of car, wheelbase, etc. They then will be able to supply you with springs that have the necessary flexibility, camber and load sustaining qualities.

We cannot give you the length of the steering column, as this will depend upon where you place your seats. You can ascertain this by putting a seat on the chassis about in the position the driver will occupy. Then run a clothes pole or something similar from the frame bracket position of the gear up to a comfortable distance for driving. By a little experiment this way you can get the correct length of the column, measuring the stick. The frame bracket you get with the gear will determine how it is to be put on. Most of them do not rest on top of the frame but bolt to the side.

Sport Body on Ford

Q.—Publish a sport roadster body for a Ford chassis, with fenders. Also are wire wheels good for long trips and are they good for all kinds of roads and weather?—Lester Clingman, Le Mars, Iowa.

A suggestion for a Ford car rebuilt into a speedster is shown in Fig. 11. Wire wheels have demonstrated their fitness for all kinds of weather and road conditions long ago.

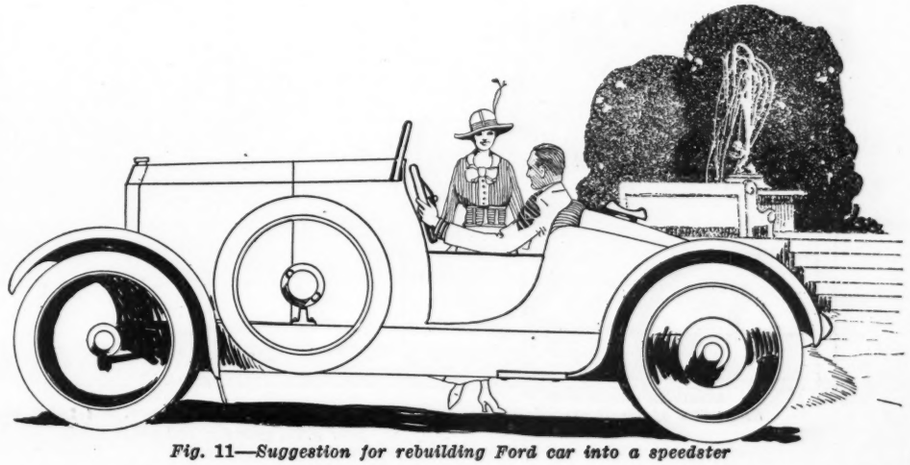


Fig. 11—Suggestion for rebuilding Ford car into a speedster

The Owners' Repair Shop

Equipping the Owner's Shop

HEREWITH is an illustration showing the end view of a small private garage with bench built into the structure. The plan view shows the general arrangement of the garage and shop, giving the relative positions of the bench, lathe, post drill, grinder, etc. This arrangement has worked out well, but, of course, the owner must decide whether it will fit his garage. Where a new building is put up, the owner would do well to incorporate the shop, even though the structure has to be made longer. The lathe and grinder should be driven from a countershaft placed overhead, the whole being driven by an electric motor. The lathe should not be very large, as the average owner will never be called upon to do a job of cylinder grinding or other work of this caliber.

Post Drill Needed

Drilling holes is one of the most frequently performed operations in the shop and while the lathe can be used for this, the best plan is to install a post drill, such as seen in blacksmith shops. These are comparatively cheap, costing from $5 to $10 and tney are fitted with a two-speed device, so that holes of 1 or 1¼ in. can be drilled as readily as the smaller sizes. Most of these drills are made with a chuck that takes ½-in. round shank drills, and the smallest size that can be accommodated is about ⅛ in. Very often it is desired to drill a small hole through the end of a bolt for a cotter, and in such cases the breast drill is resorted to, as its chuck will take drills down to 1/16 in. Here is a tip for owner-repairmen. When you want to drill small holes remove the shank that holds the chuck on your breast drill and fit chuck and all into the chuck of the post drill, as shown in the illustration. The shank on most breast drills is very close to ½ in. in diameter, consequently it will just fit the post drill chuck and in this way small work can be handled as well as large. The set screw of the post drill chuck should not be jammed down too hard as it will deface the shank of the breast drill.

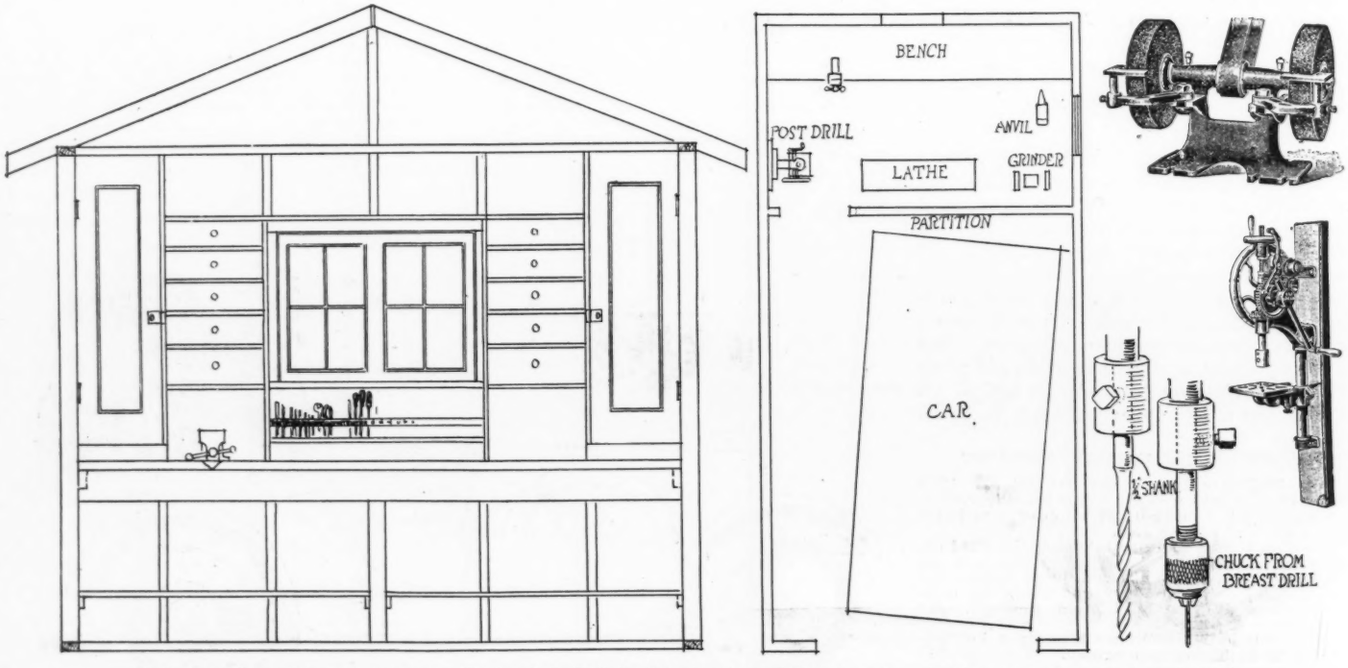
Post drills are easy to install and always come attached to a hardwood plank. To fasten to the wall two pieces of wood should be lag-screwed to the 2-by-4s, one near the top and the other near the bottom of the plank on drill. The plank then can be attached to the pieces with bolts. Fit large washers under the heads and nuts of these bolts, as there is considerable pull on them when large work is being drilled. The reason the drill is mounted in the position on the plan view is that when long work is handled it can pr ject through the door, with no wall or partition interfering.

Next to the drill the handiest thing in the shop is a small power grinder. Not only can one sharpen twist drills, chisels, lathe tools, etc., on them, but they are handy for taking down the surface on small parts, instead of filing. Sometimes, too, the work is so hard that a file merely slides off, thus making grinding necessary. The grinder shown costs about $10 and has two wheels 7 in. by 1¼ in. A small bench should be built for it, and a good place to install it is against the partition, so you can get the light from the window on the side.

The end elevation shows an arrangement that works out well with the average garage. It will be noted that a shelf has been built across the bottom of the bench about 8 in. or so from the floor. Such a shelf comes in handy for storing tires, etc., and keeps them off the floor, leaving enough room under the shelf for such parts as muffler, exhaust pipe, etc., when they are removed for the spring or fall overhauling. Over the bench it would be well to arrange a series of drawers and cases for small tools, taps, dies, etc. These drawers should be marked on the outside, stating the contents. This helps to find them when they are wanted for a quick repair job. One of the drawers should contain nothing but nails, washers, bolts, rivets, screws, etc., and it should be divided into compartments in order that the contents may be segregated properly. If the drawer is deep enough, a removable tray could be made for it, containing the smaller sizes of rivets, etc.

Doors and Catches

The two large cases on the ends are fitted with doors and catches. These cases can contain the larger tools, such as wood saws, brace, planes, lathe attachments, etc. These cases can be subdivided into smaller compartments to suit the owner's needs.



End view of small private garage with bench built into the structure, left; plan view showing general arrangement; and post drill, grinder and other tools

The plan view also shows a small anvil incorporated into the shop equipment. This the owner by all means should have. Many times special brackets have to be made and although the vise is capable of handling some of this work it is better to confine it to the anvil, for the latter is made for hammering upon. Those with the steel face are all right for a small shop; wrought iron anvils cost too much and besides are too elaborate for a private shop. A No. 4 cast-iron steel-faced anvil weighs about 40 lb. and costs in the neighborhood of $6.

In next week's issue we shall take up the installation of the lathe, grinder and countershaft for driving them.

U. S. NEEDS WALNUT

Washington, May 3—The veneer manufacturers are being asked by the Ordnance Department to save walnut for gun stocks and airplane propellers. Major E. A. Shepherd of the Ordnance Department has issued a letter to lumber manufacturers requesting them to refrain for the duration of the war from the manufacture of veneer from walnut lumber other than butts, crotches or figured material, none of which walnut lumber is suitable for the manufacture of gun stocks or airplane propellers. The letter states further that such walnut lumber as enters into other manufacture of veneers is needed urgently by the Government, as this lumber is a vital necessity for the manufacture of gun stocks and airplane propellers for the immediate equipment of our forces.

ANOTHER DRIVEAWAY ROUTE

Buffalo, N. Y., May 3—The following route has been laid out and recommended for driveaways from Buffalo to New York, through Batavia, Hornell, Elmira, Binghamton and Middletown. The distance along this route is 430 miles, or about 75 miles shorter than the Mohawk valley route via Albany. The roads are all hard-surfaced, and there are only very short stretches of bad driving, aggregating not more than 15 miles. New York is entered by the Fort Lee ferry. The road is easily found all the way from Buffalo and may be covered in from 18 to 20 hr. actual running time.

"THE NATIONAL ROAD"

"The National Road" by Robert Bruce tells much that any American citizen would be better off with knowing. The National road is a historic path, or rather it is through a historic region. In the first place Thomas Jefferson himself, as President, authorized the beginning of its construction July 16, 1806. The road is a Government project only from Cumberland, Md., to Wheeling, W. Va. To George Washington is due the original conception of the National road. The book is well illustrated with maps and photographs, and the historic attractions are referred to in a way to be appreciated by all who are part of this great country. The book is published by Mr. Bruce in co-operation with the National Highways Association, Washington, D. C.

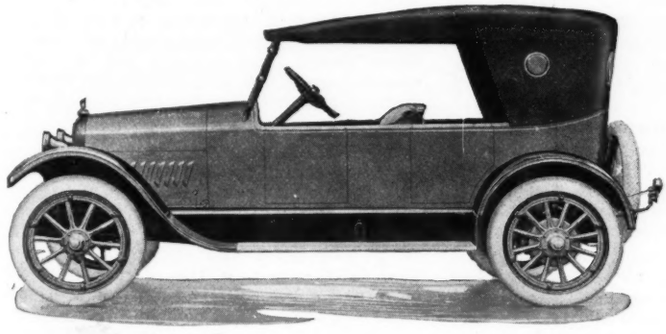
TO MAKE PATRIOT TRUCK

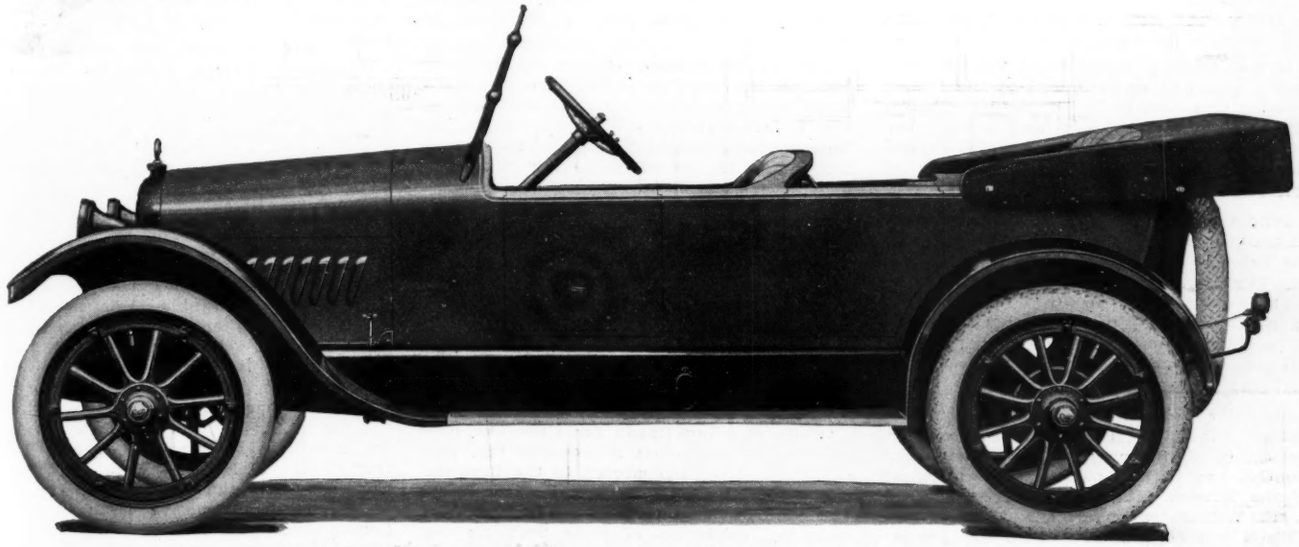
Lincoln, Neb., May 3—Work has started on a factory at Havelock, a suburb of Lincoln, for the manufacture of Patriot farm trucks by the Hebb Motors Co. The company has four small plants in Lincoln at work on trucks and truck bodies now. It succeeds to the business of the A. G. Hebb Co., which for years engaged in the manufacture of truck bodies, and is capitalized at $1,250,000. A. G. Hebb is president and general manager. The company has maintained a small factory at Detroit for a month, and engineers have been testing the truck, which will be made in two sizes this year, 1½- and 2½-ton. Only 600 trucks are scheduled for this year, but the output is expected to be increased next year.

Elgin Six Military Scout

A NEW four-passenger model has just been brought out by the Elgin Motor Car Corp. and is called the Military Scout. It is of the same seating arrangement as the five-passenger car and, according to the factory, will carry five comfortably. It is the design known in the trade as the sport model of touring car. The body design is distinctive, with the straight-line hood, slanted windshield and sides considerably lower than the hood and cowl. The upper edge of the body side has a distinct bevel. It is fitted on the regular Elgin Six chassis and sells for $1,195.

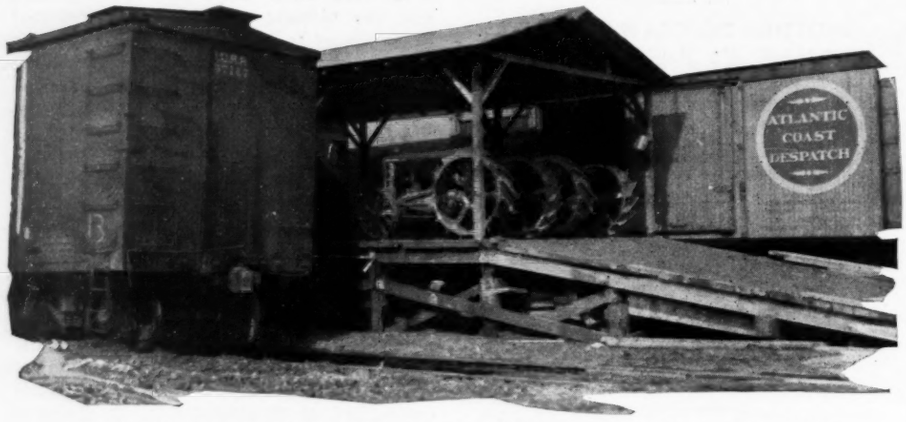
The name Military Scout was applied to this model as being significant of the record made by the Elgin Six War Scout, a standard touring model which made a sealed chassis run from Chicago to San Francisco and return, a distance of 6202 miles, with hood, clutch and gearsets sealed during the journey. On this trip, it reported road conditions for the War Department. The name of the new design commemorates this event.





Elgin Six Military Scout, showing how it looks with the top down and top up

Among the Makers and Dealers



LAUNCHING FORDSON TRACTORS TO THE FARMER—Double-loading platform at Fordson tractor plant, from which Michigan's quota went forth and those for Iowa and Ohio will go

CAMPBELL with Detroit Branch Now—R. B. Campbell, branch manager of the Bearings Service Co., formerly located at Atlanta, Ga., has been transferred to the Detroit branch.

Dodge Munitions Plant Completed—The Dodge Brothers munition plant is completed, and fully 80 per cent of the machinery is installed. Production on a small scale has started, that is, as much as was possible with the available equipment.

Paige-Detroit Adds to Building—The Paige-Detroit Motor Car Co. is preparing to add two units to its executive building which will increase the space by 50 per cent and which will provide for the requirements of the new Paige truck department as well as for other increased business.

Whitston to Operate from Chicago—C. W. Whitston hereafter will make his headquarters in Chicago, from which city he will have supervision over dealers in the Mississippi Valley district for the Fulton Motor Truck Co. Mr. Whittston was a former Detroiter and founder of the K-R-I-T Motor Car Co.

Charles A. Francis Dies—Charles A. Francis, superintendent of the body department of the Packard Motor Car Co., Detroit, is dead. Mr. Francis was for twenty-five years superintendent of the Studebaker factory in South Bend, Ind., and was with the Packard company for eight years.

Lumen Bearing Shows Plant Movies—At a recent dinner given in Detroit by the Lumen Bearing Co., Buffalo, N. Y., moving pictures of its plant were shown and stereopticon slides illustrated recent micrographic experiments and determinations. Executives of motor car plants were present.

Long Company Erects Addition—Work on an addition will be started in a few days by the Long Mfg. Co. The new structure will be 66 by 125 ft. and increase the floor space of the plant 18,000 sq. ft. The company expects to be ready to occupy it within sixty days after actual construction begins. It will be two stories in height to conform with the present building.

Findlater Succeeds Willson at Briscoe—James Findlater, general supervisor of Pacific coast business for the last eight months, has been appointed sales manager of the Briscoe Motor Car Co. to succeed L. E. Willson, who resigned May 1. Mr. Willson will be connected with the Brown, Willson Co. of Chicago and Des Moines and will handle motor cars at wholesale and retail. He will take on the Briscoe line and others.

Motor Salesman for Eighteen Years—Lester I. Weiss, St. Louis, Mo., who has been connected with motor car selling for eighteen years, beginning as office boy, has joined the Cadillac sales force in that city.

Prest-O-Lite Manager Is Distributer—V. M. Brady, for six years manager of the St. Louis, Mo., branch for the Prest-O-Lite Co., has taken over that business as distributer for Prest-O-Lite products.

Tractor Motor Ready to Produce—The final organization of the Tractor Motor Co., Boyne City, Mich., which will manufacture engines under the Field Motor Co. patents has been completed and operations will start immediately.

Trade Association Closes for War—The board of directors of the Montreal Automobile Trade Association, Montreal, Canada, at a recent meeting decided to suspend active operations from now on until after the war. Their offices will be closed.

War Office for Drake—J. Walter Drake, president of the Hupp Motor Car Co., has been elected vice-president of the Wayne County War Preparedness Board. A permanent office will be established at the board of commerce, with a secretary in charge.

Thomas to Manage Stearns Sales—J. V. Thomas has been promoted from assistant sales manager to general sales manager of the B. F. Stearns, Cleveland, Ohio. Mr Thomas was associated with the Moon Motor Car Co., of which he had charge of general sales prior to joining the Stearns company a year ago.

Canadian Firm Buys Port Huron Plant—The Chief Motor Co., a Canadian corporation, capitalized at $1,000,000, has purchased the Port Huron plant of the Monroe Motor Co. and will manufacture engines for farm tractors. J. H. Erd and H. S. Erd of Saginaw, formerly of the Erd Motor Co., are the principal officials. The company will employ 300 men.

Comet Building Ready for Use—The new building of the Comet Automobile Co., Decatur, Ill., has been offered to the business men of the city for a Made-in-Decatur show. The various manufacturers of Decatur will make an exhibition of their products the last of May. The main building of the concern is 600 ft. long. The machinery will be installed as soon as the show is over. Parts of cars to be used in assembling are commencing to arrive, and the plant will be in full operation by June 1.

Wise Now with Acason Truck—M. J. Wise, former district sales manager of the Federal Motor Truck Co. in the Middle West, has been appointed district sales manager for the Acason Motor Truck Co. for the same territory.

Universal Foundry Plans Buildings—The Universal Machinery Co., Milwaukee, Wis., manufacturer of lathes, boring mills, drill presses, etc., is planning to build a complete new plant costing about $125,000 at the north limits of West Allis, manufacturing suburb of Milwaukee. The first units to be built will be a machine shop, 150 by 300 ft.. foundry, 90 by 160 ft.; power house, 40 by 60 ft., and auxiliary structures.

Hurst Leaves Chevrolet for Doble—F. E. Hurst, for the last year and a half assistant factory manager for the Chevrolet Motor Co., has resigned to become associated with H. L. Innes, former factory manager for the Chevrolet and now vice-president and general manager of the Doble-Detroit Steam Motors Co., Detroit. Prior to coming to Flint, Mr. Hurst was with Dodge Brothers for two years and also with the Hupp and Grabowsky Power Wagon companies.

Monarch Tractor Adds to Plant—The Monarch Tractor Co., Watertown, Wis., has broken ground for a one-story brick and steel shop addition, 140 by 160 ft., and is planning to enlarge its foundry. The Monarch Tractor Co., Ltd., Toronto, Canada, a subsidiary concern, has completed the work of erecting a factory group in that city and will start regular production of tractors about May 1. The company has been overcrowded since last fall, due to the development of tractor demand during the last year.

Boone Tire New Plant—The Boone Tire & Rubber Co., Sycamore, Ill., expected to place its No. 2 plant, located at Chippewa Falls, Wis., in operation on a regular production schedule May 1. The plant consists of a main building, 83 by 260 ft., with 37,000 sq. ft. of floor space, and will employ 350 men. The daily output at the start will be 750 tires and tubes and 12,000 pairs of rubber heels and soles. The company has invested nearly $85,000 in the new plant. It is planned to market the output on a co-operative sales basis.

Wisconsin Duplex Prepares Plant—The Wisconsin Duplex Auto Co., originally organized at Clintonville, Wis., and now located at Oshkosh, Wis., is re-tooling and equipping the former plant of the J. L. Clark Carriage Co., and expects to be ready to start its regular production of chassis by July 1. The design has been perfected and work on the preparation of jigs, dies and special machinery is now under way.

Lemke Helps Out Uncle Sam—The Lemke Electric Co., Milwaukee, Wis., which conducts one of the largest electrical equipment laboratories and repair works in the country, is giving its assistance to the Government through instruction to detachments of six enlisted men in the aviation section of the Signal Corps, each detachment remaining from four to six weeks. The men come from Kelly Field, San Antonio, Tex., for practical instruction in the care and repair of electrical automotive equipment. The Lemke company for several years has been official Wisconsin distributor and service sta-

Denver, Col.—Balvin Tire Co.; capital stock, $10,000; incorporators, G. W. Balvin, A. J. Balvin and A. L. Balvin.

East St. Louis, Ill.—Missouri-Illinois Tractor Co.; capital stock, $10,000; incorporators, Dan Arbogast, Neva Argobast, H. A. Jenkins and N. S. Jenkins.

Frederic, Md.—Automotive Tractor Co.; capital stock, $150,000; incorporators, C. E. Cline, Thomas E. Kling and George F. Smith.

Frederick, Okla.—Williams Vulcanizing Co.; capital stock, $6,000; incorporators, W. J. Williams, E. J. Cowen and A. L. Barker.

Gambier, Ohio—Climax Interstate Sales Co.; capital stock, $30,000; incorporators, Eugene M. Pavey, Clara A. Pavey, S. P. McCollum, Blanche L. McCollum and Charles C. Pavey.

Gotebo, Okla.—Gotebo Tire & Accessory Co.; capital stock, $10,000; incorporators, R. L. Statler, J. M. Reeves and W. R. Patterson.

Grand Forks, N. D.—Grand Forks Tractor Co.; capital stock, $250,000; incorporators, P. W. Miller and L. C. Stearns.

Hammond, Ind.—Liberty Tractor Co.; capital stock, $50,000; incorporators, F. E. Gossett, Cornelius Moor, L. H. Whittaker, Max Salmon and Herman Rettig.

Indianapolis, Ind.—Johnson Motor Wheel Co.; capital stock, $100,000; incorporators, Hobart E. Marshall, O. C. Decker and A. C. Schubert.

McAlester, Okla.—Gwin Automobile Co.; capital stock, $5,000; incorporators, T. T. Lewis, J. H. Gwin and D. A. McDonald.

Miami, Okla.—Miami Auto Supply Co.; capital stock, $25,000; incorporators, H. P. Smith, W. S. Rush and E. W. Collins.

Milwaukee, Wis.—Tire Recruiting Machine Co.; capital stock, $50,000; incorporators, George J. Thust, Ray J. Thust and Adeline Thust.

Monroe, Wis.—Monroe Sales Co.; capital stock, $30,000; incorporators, Roy Jaberg, Fred Faeser, Dr. W. G. Bear, J. J. Tschudy and Frank P. Davis.

Oklahoma City, Okla.—Crane-Hayers Motor Sales Co.; capital stock, $10,000; incorporators, Ross Crane, Charles C. Crane and F. H. Hayers.

Oklahoma City, Okla.—Service Automobile and Tire Co.; capital stock, $100,000; incorporators, W. H. Hedrick, Gus Diamond and H. C. McQuaid.

Oklahoma City, Okla.—Smith-Paris Motor Co.; capital stock, $25,000; incorporators, J. J. Weedley, J. C. Smith and A. E. Reid.

Recent Incorporations

Phoenix, Ariz.—Gorham-La Place Motor Car Co.; capital stock, $50,000; incorporators, I. J. Lipsohn, D. A. Foster and M. A. Pickett.

Rockford, Ill.—Swan Motor Corp.; capital stock, $5,000; incorporators, F. E. Teachout, G. O. West, F. R. Swan and T. H. Kelly.

Salina, Kan.—Central Kansas Motor Co.; capital stock, $25,000; incorporators, Metz Wright, Dr. E. J. Lutz and Sarah Wright.

South Bend, Ind.—Lomont & Co., Fort Wayne, Ind.; capital stock, $75,000; incorporators, Clement J. Lomont, John A. Lomont, J. A. Becker and Ameil C. Gladieux.

Sandusky, Ohio—Sandusky Buick Co.; capital stock, $25,000; incorporators, C. B. Hule, A. K. Nier, R. K. Ramsey, E. B. King and M. L. Osborn.

Sandusky, Ohio—Griswold-Wagg Motor Co.; capital stock, $10,000; incorporators, Glen Willis Griswold, August W. Allendorf, Fred H. Zerbe, Nelson E. Wagg and Claude J. Minor.

Sapulpa, Okla.—Auto Needs & Supplies Co.; capital stock, $15,000; incorporators, William J. Hyde, Grover C. Hyde and Homer F. Hyde.

Shadyside, Ohio—Shadyside Auto Co.; capital stock, $10,000; incorporators, W. T. Jones, O. M. Atkinson, J. C. Berry, M. D. Mayhugh, Joseph Mitchell, John A. Robinson, J. R. Gabel and Crawford Neff.

Shiner, Tex.—Lone Star Motor & Supply Co.; capital stock, $15,000; incorporators, Anna Bozka, M. I. Bozka, J. Paget and T. H. Denton.

South Bend, Ind.—Columbia Battery Co.; capital stock, $10,000; incorporators, Otto M. Knoblock, F. L. Stedman and William B. Starr.

Sioux City, Iowa—White Motor & Tractor Co.; capital stock, $50,000; incorporators, John M. White, Thomas E. Peck and P. P. Wermerskirchen.

South Bend, Ind.—Johnson Motor Wheel Co.; capital stock, $100,000; incorporators, Hobart E. Marshall, O. C. Decker and A. C. Schubert.

Toledo, Ohio—Britton Auto Signal Co.; capital stock, $25,000; incorporators, Paul T. Gayner, William H. Fagan, Margaret F. Kaley and Blanche O'Brien.

Toledo, Ohio—Doan Motor Co.; capital stock, $30,000; incorporators, Charles E. Doan, Andrew J. Johnson, Arthur L. Johnson, Thomas L. Gifford and Hubbard S. Woodbury.

Toledo, Ohio—Security Motor & Truck Co.; capital stock, $25,000; incorporators, Richard S. Barret, Clarence J. Sager, P. V. Hechler, Louis H. Firth and Sheldon Stebbins.

Toledo, Ohio—S. Y. Brigham Motor Co.; capital stock, $20,000; incorporators, Soavey Y. Brigham, J. Harry Frambach, Charles P. Carroll, Rollin D. Potter and Arthur Frambach.

Toledo, Ohio—Throne Auto Co.: capital stock, $25,000; incorporators, H. E. Throne, Stanley F. Sawyer, William H. Schroeder, Walter H. Crause and S. S. Wall.

Toledo, Ohio.—Oldham Auto Sales Co.; capital stock, $20,000; incorporators, George F. Oldham, Charles F. Wise, Roy Wise, Blanche O'Brien and Margaret F. Kaley.

Tulsa, Okla.—Liberty Garage & Service Co.; capital stock, $5,000; incorporators, H. P. Smith, W. A. Ralston and F. W. Bye.

Wapakoneta, Ohio—Wapakoneta Overland Co.; capital stock, $10,000; incorporators, W. C. Heinrich, A. J. Brown, S. H. Sibert, R. B. Cullilton and R. B. Wahrer.

Youngstown, Ohio—Interstate Automobile Co.; capital stock, $40,000; incorporators, S. A. Pfau, William E. Pfau, C. E. Sederland, W. H. Vanskiver and George H. Coller.

Youngstown, Ohio—Brockway Motor Truck Co.; capital stock, $10,000; incorporators, George A. Brockway, Lewis Stocker, Kalmer T. Sanders, Arthur Nelson and Frank L. Oesch.

Youngstown, Ohio—Hooper Motor Co.; capital stock, $20,000; incorporators, H. R. Hooper, M. H. Hooper, E. I. Davies, Franklin B. Powers and C. A. Manchester.

tion of the Bosch, Simms, Mea and Splitdorf magnetos, starting, lighting and ignition systems; Atwater Kent, Gray & Davis, Auto-Lite and Connecticut devices.

Innes to Manage Doble-Detroit—Henry L. Innes, formerly factory manager of the Chevrolet plant at Flint, Mich., and more recently assistant general manager of the General Motors Co. of New York, is now vice president and general manager of the Doble-Detroit Steam Motors Co.

Browning Is Republic District Manager—L. E. Browning has been appointed district manager for the Republic Rubber Corp. in seven states, Montana, Idaho, Utah, Wyoming, Colorado, Arizona and New Mexico, with headquarters in Denver, Col. Mr. Browning was with the Kansas City branch and in charge of the sales end of mechanical rubber goods in that territory.

Case Has Extra Payment Plan—The J. I. Case Threshing Machine Co., Racine, Wis., has established a plan for extra payments to all its employees, except those receiving in excess of $2,500 a year. Each employee who continues on the payroll of the company for a year will receive an extra 10 per cent for the year. Employees absent from work without excuse as much as 5 per cent of a quarter get only half the extra payment for that quarter. Employees who leave during the year forfeit their rights to extra payments not already received. Payments are to be made quarterly.

Chicago Adds Downtown Garage—The opening of the Board of Trade garage May 25 in Chicago will help solve Chicago's downtown restricted area parking problem. At the same time it offers a solution to like problems in other cities. The building will be six stories high when completed and will have a total capacity of 600 cars. William L. Heptig and P. J. Ryand, who operated a similar garage in the district during the last year, are the owners. The motto is "Service, Courtesy, Efficiency and No Tips."

Norton Leaves Selden for Army—W. T. Norton, for the last eight years chief engineer of the Selden Motor Vehicle Co., Rochester, N. Y., has rsigned and will be in the motor truck division of the Army. Mr. Norton remains consluting engineer. In view of the changes John R. Coleman becomes assistant general manager in charge of engineering and production, and R. E. Martson has been made executive engineer.

Studebaker Promotes Its Men—R. H. Williams, formerly manager of the Detroit branch of Studebaker Corp., has been made assistant director of sales with headquarters at South Bend, Ind. L. A. Keller has been made manager of branches. George L. Willman becomes manager of the Chicago wholesale branch, while J. E. Grady, general sales manager of the Canadian factory, takes over the management of the Detroit branch in addition, with S. A. MacGonigal as assistant. A. J. Brechtel has been promoted to the managment of the Des Moines wholesale branch, while Perry E. Ewell has been appointed assistant manager of the Cleveland district of the sales organization. All these men were Studebaker men before the appointments.

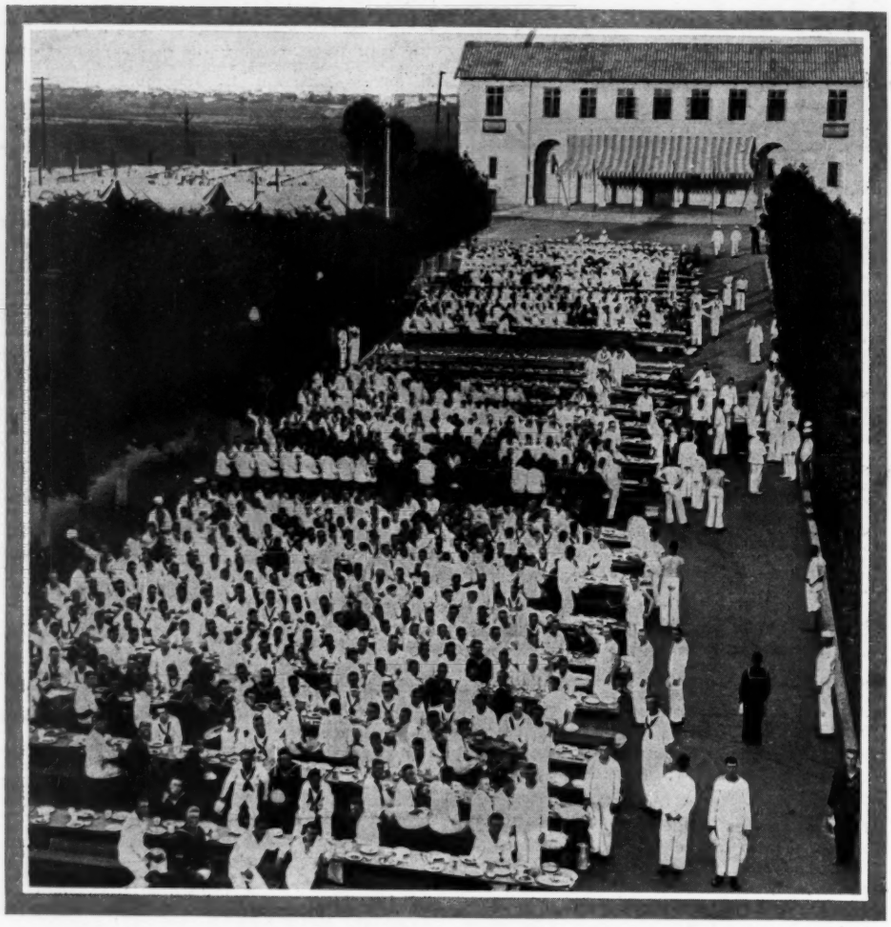
Atterbury Office for Clare—W. A. Clare, for two years general sales manager of the Atterbury Motor Car Co., has been appointed assistant secretary of the company.

Dearborn Truck in New Quarters—The Dearborn Truck Co., Chicago, has purchased a $105,000 three-story brick building, more than quadrupling the capacity of its old plant. A private switch track is included.

New Rubber Plant at Milwaukee—A rubber manufacturing plant will be established in Milwaukee, Wis., by the Great Lakes Rubber Co., organized with a capital stock of $100,000 by Donald C. Barbee, general manager of the Badger Belt & Rubber Co., Milwaukee. Five acres of land have been purchased in Cudahy, a suburb, and the first unit of the new plant will afford about 45,000 sq. ft. of floor space.

CASE CAMOUFLAGES TRACTOR INTO TANK—This is one of the floats which took part in the celebration of Texas Independence Day at Dallas. It is a Case tractor made up as a British tank

From the Four Winds



WITH OUR BOYS IN CAMP AT SAN DIEGO—San Diego, Cal., has 5,000 sailors in the making. Physicians there say eating in the open has added 20 per cent to the health standard of the camp

APRIL Snow Greets Boston Motorist—Frank Allen, manager of the New England Chalmers branch, found plenty of snow in New England not so long ago, although winter was supposed to have disappeared, when he made a trip from Boston to Bretton Woods and back by motor. He left early in the morning, going via Merrimac valley up through Franconia Notch, where he struck the first deep drifts. From there on around the mountains to Bretton Woods and down Crawford Notch the snow was deeper. Some of the roads had not been broken out. He claims his Chalmers is the first car to go through Crawford Notch since last fall. He had to shovel out paths and use ropes in some places to get through. Then he went down to Poland Springs and back by way of Portland, completing the trip of 422 miles in 22 hr. 56 min. He carried three passengers.

Club to Observe County Road Needs—The spring road-inspection trips of the Automobile Club of Kansas City, Mo., will have a semi-official character, at the suggestion of the county court of Jackson county. The assistance of the club was offered and accepted at a conference April 16 with the county officials. The spring tours, under the direction of the good roads committee, planned originally as a feature of the local movement toward use of the highways for inter-community truck traffic, will have a very definite purpose. Records will be kept of the observations of the committee members and helpers, and conferences will be held after each trip for a report to the county court of the condition of roads. Observations also will be made on the use of highways, and emphasis will be placed on recommendations for improvement of paved or unpaved roads.

One Vote Delays Highway Work—The opposition of one commissioner, who has always been a hard worker for good roads, but who does not believe in the use of convict labor in their construction, the New Jersey highway commission has been held up for over a month in its efforts to get the work on the state's $15,000,000 highway system started. The death of one of the eight members of the commission and inability of two others to attend meetings has allowed the one negative vote to control the situation.

Louisville Club Protects Members—The Louisville Automobile Club has registered all its members' cars against theft by issuing to each member a celluloid plate to post inside the car. The plate is a two-color design and offers a reward of $25 for the arrest and conviction of anyone for stealing a car which is the property of a member of the organization. While the thefts of motor cars have been very numerous in Louisville lately, the club boasts the remarkable record for the last twelve months of having recovered all cars stolen from the members of the club with one exception.

St. Paul Motor Car Regulation Invalid—The St. Paul ordinance requiring motor cars to stop 10 ft. in the rear of a streetcar with open gates is invalid, according to a decision made by Judge C. C. Houpt of the district court in a habeas corpus case. The state law as well as the Minneapolis ordinance rules that in approaching or passing a streetcar stopped for passengers the driver of a motor car shall slow down or, if necessary for safety to public, shall bring the vehicle to a full stop not less than 10 ft. from the streetcar. The state law prohibits conflicting local regulations, except as to parks, parkways, boulevards and cemeteries.

Signs for Connecticut Grade Crossings—The Connecticut state public utilities commission has extended to May 1 the time for all municipalities to erect at grade crossings warning signs furnished by the railroad companies. The law passed by the last legislature allowed six months after passage for the erection of the signs. The six months expired last November. The public utilities commission found that owing to the difficulties created by unusual transportation conditions it was impossible to procure the material for the signs and extended the time accordingly.

Trucks in Oil Field Regions—Motor trucks are rapidly coming into general use in the oil fields of the Gulf coast region. Practically all the American and British companies operating in the different producing districts adjacent to Tampico, Mexico, have adopted motor trucks to transport their camp supplies and much of their drilling and pipe line materials. New and well improved roads have been constructed by the oil companies, and localities in the tropical wilderness that were formerly almost inaccessible are now connected with the outside world by good motor truck roads.

Ohio to Improve Buffalo Roads—Two of the most important roads in Northern Ohio are scheduled for improvement this year. They are the Ashtubula-Conneaut link of the Buffalo route and the Northfield road from Cleveland to Akron. It is hoped to have work started on both roads this season. When the Conneaut link is completed, a hard-surfaced road will run from Toledo by way of Cleveland to Buffalo. Traffic between Akron and Cleveland is greater than between any other two cities in the state, and Akron industries are said to be almost entirely dependent on highway transport to Cleveland.

Blazes Trail of East Michigan Pike Tour—A pathfinding tour over the East Michigan Pike will be made within a short time by Don F. Huestis of Harbor Beach, treasurer of the East Michigan Pikes' Association, preparatory to the third annual trip over the highway. Mr. Huestis will make all arrangements on the pathfinding tour for the handling of the guests in the various communities and for the meetings, which will be held in every town where road building has not been taken up. The Detroit Automobile Club has the East Michigan Pike marked from Detroit to Saginaw. Mr. Huestis will arrange with the various county vice-presidents north of Saginaw to place signs the rest of the way to the Soo.